PAPER TRADE JOURNAL

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

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No. 24

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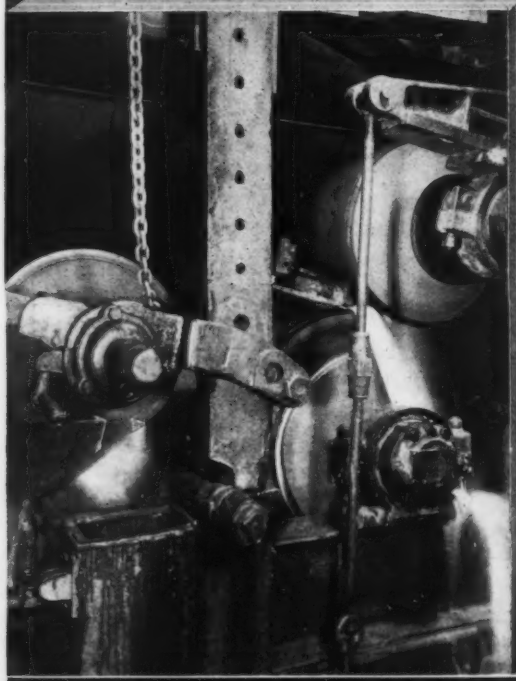

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GOOD WIRES

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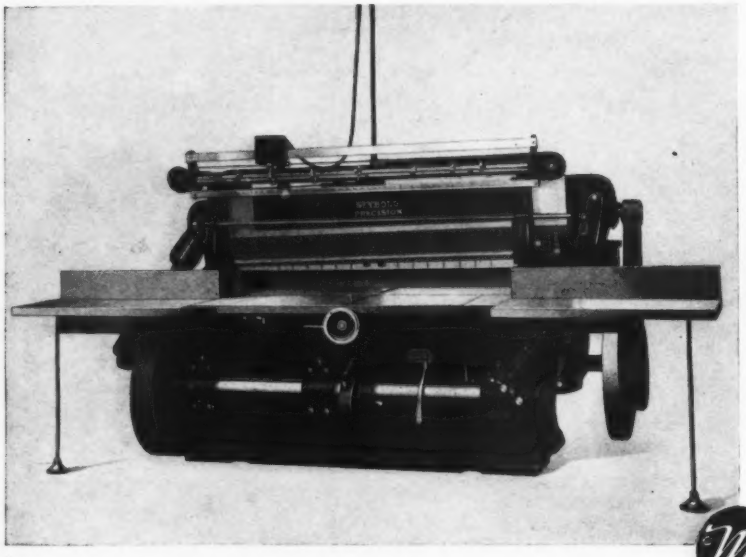
WITH MODERN PRODUCTION



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PAPER — SIXTY-SEVENTH YEAR — PAPER

Established Feb. 17, 1899
Consolidated Nov. 16, 1899
with Paper Trade Journal.

Vol. CVII, No. 24 Thursday, December 15, 1938

Established Sept. 21, 1918
Consolidated Feb. 19, 1925
with Paper Trade Journal.

Pulp Production Gains 34 Per Cent in 1937

Total Domestic Production Increased From 5,032,299 Tons Valued At $165,322,871 In 1935 To 6,757,842 Tons Valued At $244,667,297 In 1937 —Wage Earners In 1937 Were 26,994, Increasing 14 Per Cent Over 1935.

Manufacturers of pulp reported a moderate increase in employment and considerable increases in wages and production for 1937, as compared with 1935, as shown by the preliminary figures compiled from returns of the recent Biennial Census of Manufacturers, just released by Director William L. Austin, Bureau of the Census, Department of Commerce.

The number of wage earners employed in 1937 was 26,994, an increase of 14.3 per cent over the 23,627 reported for 1935, and wages paid in the industry increased 43.5 per cent, from $23,401,212 for 1935 to $33,570,346 for 1937. The total value of all products made in the industry in 1937, $247,191,957,

(Continued on page 24)

TABLE I.—SUMMARY FOR THE INDUSTRY: 1937, 1935, AND 1933

(Because they account for a negligible portion of the national output, plants with annual production valued at less than $5,000 have been excluded since 1919)

	1937	1935	1933	Per cent of increase 1935-1937	Per cent of increase 1933-1937
No. of establishments [1]	194	188	181	3.2	7.2
Wage earners (avg. for the year) [2]	26,994	23,627	20,074	14.3	34.5
Wages [3]	$33,570,346	$23,401,212	$18,103,342	43.5	85.4
Cost of materials, supplies, containers, fuel, and purchased electric energy [3]	$153,651,946	$96,176,352	$81,896,058	59.8	87.6
Value of products [4]	$247,191,957	$167,208,261	$134,691,766	47.8	83.5
Value added by manufacture [4]	$93,540,011	$71,031,909	$52,795,708	31.7	77.2

[1] The 194 establishments reporting for 1937 represent mills operated, including 7 that manufactured pulp from materials other than wood. The 188 establishments reporting for 1935 operated 190 mills, including 6 that manufactured pulp from materials other than wood. The 181 establishments reporting for 1933 operated 185 mills, including 8 that manufactured pulp from materials other than wood.

[2] Not including salaried officers and employees. Data for such officers and employees will be included in a later report. The item for wage earners is an average of the numbers reported for the several months of the year. In calculating it, equal weight must be given to full-time and part-time wage earners (not reported separately by the manufacturers), and for this reason it exceeds the number that would have been required to perform the work done in the industry if all wage earners had been continuously employed throughout the year. The quotient obtained by dividing the amount of wages by the average number of wage earners cannot, therefore, be accepted as representing the average wage received by full-time wage earners. In making comparisons between the figures for 1937 and those for earlier years, the possibility that the proportion of part-time employment varied from year to year should be taken into account.

[3] Profits or losses cannot be calculated from the Census figures because no data are collected for certain expense items, such as interest, rent, depreciation, taxes, insurance, and advertising.

[4] Value of products less cost of materials, supplies, containers, fuel, and purchased electric energy.

TABLE II.—PRODUCTS, BY KIND, QUANTITY, AND VALUE: 1937 AND 1935

	1937 Tons (2,000 pounds)	1937 Value (f.o.b. mill)	1935 Tons (2,000 pounds)	1935 Value (f.o.b. mill)
Pulp industry, all products, total value	.....	$247,191,957	.....	$167,208,261
Pulp (wood and other fiber)	6,757,842	244,667,297	5,032,299	165,322,871
Products other than pulp (not normally belonging to the industry)	.....	2,524,660	.....	1,885,390
Wood pulp, total	6,617,184	227,796,971	4,925,669	149,981,900
Mechanical, total	1,600,667	30,315,251	1,355,819	24,972,104
Not steamed	1,513,047	28,281,135	1,205,199	22,224,975
Steamed	87,620	2,034,116	150,620	2,747,129
Sulphite, total	2,162,771	111,029,418	1,579,567	70,425,758
Unbleached	814,102	31,827,729	634,947	21,909,660
Bleached, total	1,348,669	79,201,689	944,620	48,516,098
Superpurified and rayon and special chemical grades [1]	353,640	23,871,039	189,536	11,987,887
Other bleached	995,029	55,330,650	755,084	36,528,211
Sulphate, total	2,160,826	60,552,279	1,467,749	36,008,886
Unbleached	1,945,676	52,211,166	1,340,288	31,213,254
Bleached	215,150	8,341,113	127,461	4,795,632
Soda, unbleached and bleached, total	507,548	23,465,719	[2] 485,162	[2] 18,165,468
Semi-chemical and other wood pulp, total	132,521	1,748,316		
Screenings, total	52,851	685,988	37,372	409,684
Mechanical	9,674	69,667	3,902	22,146
Chemical	43,177	616,321	33,470	387,538
Other pulp [3]	140,658	16,870,326	106,630	15,340,971

[1] Combined to avoid disclosing data for individual establishments for 1937. The production of superpurified pulp in 1935 was reported as 63,066 tons, valued at $4,817,774.

[2] Soda and semi-chemical pulp only. Combined to avoid disclosing production reported by an individual establishment.

[3] Cottonseed-hull-fiber pulp, cotton-linter pulp, rag pulp, and reclaimed paper and straw pulp.

Carlisle Explains Status of Great Lakes Co.

Former President of Great Lakes Paper Co. Informs Customers Reason For His Resignation and Comments On Financial Position of Company —Pulpwood Output Curtailed In Northern Ontario — Other Late News.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., December 12, 1938—C. H. Carlisle, former president of the Great Lakes Paper Company, Fort William, Ont., recently sent a letter to all customer-shareholders of the company explaining his action in resigning the presidency of the organization and asking them to stay with the company. It is understood to have been written because he had been informed that some of the customers planned to place their business with overseas producers and to cancel their contracts. In part, he stated that if the company was not restricted in operations, by September next it should have liquidated its bank loan and other current indebtedness, putting it in a position to earn its dividends in full and later to liquidate accumulated dividends. A net of 54 cents a share on preferred stock in the ten months is indicated by the fact that Mr. Carlisle said, in his letter, that the accumulated earned surplus stands at $283,264. At the end of 1937 it stood at $175,120 which would indicate a net in the meantime of $108,744 on 200,000 "A" and "B" preference shares. Earnings have evidently been increasing because the company's statement of earnings to June 30 showed net of $41,303. This would indicate that in the four following months $67,441 has been earned or against an average of $6,884 in the first half of the year. Estimating depreciation at $255,500, bond interest at $250,000 and interest on deferred coupons at $11,250 for ten months but not making any allowance for possible payment to other companies as an alternative to proration (because the company shipped 16,000 tons more than its quota) it is contended that the earnings for ten months to Oct. 31, 1938, before depreciation, must have been enough to meet all 1938 bond interest needs more than twice and to meet them 1.2 after depreciation and taxes.

Pulpwood Curtailed in Northern Ontario

Lack of markets and overproduction has curtailed the demand for pulp wood in Northern Ontario with the result that some 12,000 men who would be normally engaged in this work are now unemployed. To meet this emergency, Hon. Norman Rogers, Federal Minister of Labor, has offered a public works scheme to Ontario on the basis of $1,000,000 contribution by the federal and provincial governments. Details of the plan are now being worked out. It is proposed that the $2,000,000 be expended under a joint agreement to provide for highway construction and conservation work.

H. C. Draper Comments on European Pulpwood

Henry C. Draper, K. C. of the Huron Forest Products, Limited, Toronto, former Deputy Minister of Lands and Forests for Ontario, who lately returned from an extended trip overseas visiting Norway, Sweden and Finland, says that the people of these countries attach great importance to the development of their forest resources. Canadians, in considering the European lumber, pulp and allied industries, think particularly of Finland, Sweden and Norway because those three countries have been operating for the past number of years in direct competition with Canada. In all three, the fullest possible development of the forest resources is considered to be a prime essential. That the lumber, pulp and paper business should be so regarded is only natural, because 82 per cent of the export trade of Finland is made up of the products of the forest wealth of that country. In Sweden 42 per cent of the total exports are products of the forests, and in Norway, notwithstanding the tremendous fisheries and mineral business carried on, the forest products industries account for over 27 per cent of the total export business.

The proportion of forest area in Finland of 73½ per cent, is larger than in any other European country. Likewise, per head of population, Finland is the richest European country in forest wealth, and in absolute figures is only exceeded in Europe by Russia. Sweden's forest wealth in absolute figures is about the same as Finland's. In Norway, because of the very mountainous nature of the country, the area of productive woodlands is about 25 per cent of the total.

F. W. Rose Congratulated on 71st Birthday

Many friends in the paper trade have extended congratulations to Fred W. Rose, president and manager of the Hunter, Rose Company, Limited, Toronto, which his father started in 1860, on attaining his seventy-first birthday. He has been associated with the firm for more than half a century. Mr. Rose was born in Ottawa and in his younger days was a well known lacrosse player.

Forests 75 Per Cent Privately Owned

In all three countries over 75 per cent of the forest area is owned privately. In Finland, the law for private forests prohibits the felling of trees in such a way, or leaving the soil after the felling in such a condition, or using the soil in such a manner that natural regeneration is endangered. The law also forbids the cutting of young growing forests except by means of rational thinning. If a forest is felled contrary to the law, the forest is closed, and the prohibition or restriction of the cutting is enforced by the Government. If the area has been devastated, it must be reforested; regeneration must be safeguarded, and the cost of the work must be borne by the person responsible for the cutting operations. If the cutting has been done by someone other than the owner of the forest and the reforestation or other necessary costs cannot be collected from him, the owner of the forest is responsible. The enforcement of the law is entrusted to a special organization which also takes charge of the development of private forests by giving advice, instruction and general education.

News of the Wisconsin Paper Industry

Menasha Wooden Ware Moving Bulk of Plant To Ladysmith But Corrugated Factory Will Remain At Menasha—Commission To Test Federal Power Jurisdiction — To Enter 170,000 Acres Under State Crop Law.

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., December 12, 1938—Although the Menasha Wooden Ware Company is moving most of its plant operations to Ladysmith, Wis. January 1, its corrugated carton factory will remain at Menasha, Wis., according to announcement made by company officials.

The company has been making wooden containers since 1849, largely barrels, pails, kegs and butter tubs, but in 1927 opened up a division to make corrugated cartons. This division has flourished, and will be retained at Menasha because of the proximity to mills making corrugated board. The butter tub department will be continued at Menasha also. A toy department established several years ago will be discontinued. The new operations at Ladysmith will be largely in the pail and handle division.

Officers of the company are: Mowry Smith, president; Donald C. Shepard, Donald Turner and Carlton R. Smith, vice-presidents; John O. Schmerein, secretary, and Jacob Liebl, treasurer.

Pulpwood Shipments Increase on Great Lakes

Movement of pulpwood and wood pulp by boat via the Great Lakes has been more extensive this year than in any past season, according to unofficial figures compiled for the port at Green Bay, Wis., where most of the supply for the Fox River Valley mills is handled for delivery to mills either by barge or rail.

The figures show that 203,938 bales of pulp and 132,978 cords of pulpwood were handled during the season just closed, topping all previous figures. Coal imports, a large portion of which goes to the valley mills, totaled 1,425,000 tons, a slight decrease from the previous year.

Commission To Test Federal Jurisdiction

The Wisconsin Public Service Commission is using the hydroelectric plant under construction by the Wisconsin Public Service Corporation at Tomahawk, Wis., as a test of jurisdiction by the Federal Power Commission. The company is spending approximately $500,000 for the plant, located at the site of the former Tomahawk Pulp and Paper Company. The commission also authorized construction of a hydro-electric plant by this company at the dam recently purchased from the Grandfather Falls Paper Company, on the Wisconsin River near Merrill, Wis. This project represents a cost of $1,709,934.

The commission contends the Wisconsin River is not navigable at Tomahawk, but the federal commission holds the dams are subject to its jurisdiction because of their effect on navigation on the lower Wisconsin River and the Mississippi River, into which the Wisconsin flows.

Court action has been started, because Wisconsin has a "recapture" law by which all water power becomes the property of the state after a specified number of years. Should the federal contention be upheld, the state's rights might be endangered. It is contended by the Wisconsin body that the upper Wisconsin River is subject only to state jurisdiction.

The Federal Power Commission has issued a 50-year license to the City of Kaukauna, Wisconsin, to build and operate an electric plant on the Fox River, at a cost of approximately $474,518. It will be on the site acquired sometime ago from the Patten Paper Company, Ltd., which abandoned operation of its Outagamie Paper Company mill at Kaukauna. Existing facilities will be repaired and enlarged. An overflow dam and a power house will also be constructed. Work is to begin within three months.

To Enter 170,000 Acres Under Crop Law

More forestry operations are evident in an announcement by the Wisconsin Conservation Commission, Madison, Wis., that hearings will be held in January to enter more than 170,000 acres under the state forest crop law. After lands are entered, they are tax-free beyond ten cents an acre until the timber is cut. Applications by counties total 166,514 acres, and those of private owners, 5,592 acres. F. G. Wilson, superintendent of cooperative forestry, will conduct the hearings. Most of the land is in the northern forest regions, some of it in forests operated by paper mills.

Martin Downs Talks on New Uses for Paper

A constant search is being made for new fields for paper products, Dr. Martin Downs, chief chemist of the Thilmany Pulp and Paper Company, Kaukauna, Wis., told the Rotary club of Kaukauna in an address last week. "Only those that do will survive modern competition," he said.

Dr. Downs traced the history of paper making and the gradual speeding up of production until today four men will produce 300 tons in an average working day. The arts of bleaching and dyeing were explained, as well as the exacting specifications under which paper is made today to meet the demands of modern printing and packaging.

Manufacturers Want Air Mail Restored

Restoration of air mail service is being sought by paper manufacturers and converters of the Fox River Valley. Service was maintained for several years at Green Bay, Appleton, Menasha and Neenah, Wis., but was discontinued as an economy move. Petitions have been presented to the postoffice department at Washington pointing out the advantages of speedier mail service.

Among those who have urged the resumption of service are Harry C. Krueger, of the sales department of Fox River Paper Company, Richard Mahoney of the Appleton Coated Paper Company, and H. Donald Purdy, superintendent of the Tuttle Press Company.

Growing Trend Toward Lightweight Papers

Canadian and English Manufacturers Conscious of Far-Reaching Effect of Trend To Lighter Papers For More Extensive Air Mail Use—Bowater Deal In Newfoundland—Cutting Rates In Quebec Forests Is Announced.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., December 12, 1938—Manufacturers here are becoming increasingly conscious of the far-reaching effect which aerial transportation may have upon paper manufacture. Following the experiments reported from England in light-weight paper for magazines and newspapers, in order to cut down cost of transportation by aerial mail, comes the news that people in England are this year selecting Christmas cards specifically with a view to their despatch by the flying routes, the aim being to choose a card which is as light as possible, thus lessening the Yuletide loads carried by the flying boats along the trunk air-lines. It is predicted that by next year this movement will become general and that in this and many other ways manufacturers will be faced with new specifications for paper manufacture. An example of what has occurred this year has been provided by the Australian High Commissioner in London, S. M. Bruce. He has selected a Christmas card which, even with its envelope, weighs less than half an ounce. In England manufacturers this year have risen to the occasion admirably, producing cards which are printed on special paper and which, while complying with air-mail weight requirements, still maintain all the traditional Yuletide gaiety in appearance and design.

Effect of Increasing Air Mail

As showing the effect which the wholesale transfer of mail to the flying boats is having, it is officially estimated that the Christmas mail carried by airplanes from Britain to all parts of the Empire will total approximately 350 long tons, and that in this will be comprised something like 11,000,000 letters. As far as Great Britain is concerned, this Christmas will go down in history as an essentially air-mail Christmas, seeing that it is the first Yuletide season on which the great "all-up" non-surcharge scheme becomes applicable, as regards first-class mail matter, throughout the whole system of Empire airways. Apart from the great volume of out going air mail, it is estimated that British airplanes will have the big task of bringing into the Homeland, from all parts of the Empire, a total of roughly 150 long tons of Yuletide letters.

The Bowater Deal in Newfoundland

A despatch from Newfoundland states that by a vote of 150-6, St. John's Board of Trade has recorded its disapproval of the Newfoundland Government's contract with Bowater-Lloyd (Newfoundland) Limited for exploitation of the pulpwood resources of the Gander district. Under the contract the company is not obliged to establish a pulp mill in the Gander district, but is authorized to establish facilities for increased pulp production at the Cornerbrook site, recently acquired from International Power and Paper Company. The Government would also grant the company certain concessions in tariffs, export duties, taxation and water power rights. The agreement is good for 99 years.

The Board of Trade, on the other hand, holds that the Government should insist on such a policy as would assure development of the Gander area as an industrial entity and recommended in the interim export of unmanufactured wood be permitted up to a maximum of 100,000 cords annually on short term leases.

It was held in the resolution to be presented the Commission of Government the agreement was not conducive to proper protection of the country's interests in that it permitted raw wood export for an unduly long period and did not require the company to undertake "that large scale development warranted by the timber and water resources in the Gander area."

Cutting Rates in Quebec Forests

The Quebec Government has established stumpage dues ranging from 75 cents to $1.25 a cord for lumber cut in the province of Quebec to produce pulp or newsprint. These new rates will apply to all timber cut on Crown lands throughout the province and will go into retroactive effect as of May 1, 1938.

The cutting rates announced remain practically unchanged from last year, but there are slight modifications which apply to the mode and method of cutting, aimed at reducing wastage.

Some minor details are laid down for the hewing of saw logs.

Main price scales, for lumber cut to produce pulp or newsprint, are as follows:

Spruce, pine and gray pine, $1.25 a cord; same three trees, barked, to the sap, $1.40 a cord; same three trees, barked with knife or plane, $1.50 a cord; other woods, 75 cents a cord; other woods, barked with knife or plane, 85 cents a cord.

Measured according to 100 solid cubic feet the rates for the spruce, pine and gray pine will be $1.45 while the charge for various other woods will be 90 cents.

Rates for sawn woods, by which is meant logs from 8 to 20 feet long destined for sawing purposes, range from 70 cents to $1.25 on a basis of 100 cubic feet.

Carter, Rice Hold Sales Meetings

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 12, 1938—Three sales meetings are to be held by Carter, Rice & Company primarily to instruct and help the salesmen in the coarse paper department who are not so familiar with fine papers and envelopes as those associated with the fine paper sales. They are scheduled to take place the evenings of December 14, 21 and 28. Mr. Crowell, Mr. Welsh and Mr. Pratt will be in charge of these meetings respectively.

Chicago Paper Trade Reflects Seasonal Lull

With Some Lines of Paper Showing Improved Demand, Midwest Market Reports Usual Pre-Inventory Quiet Prevails — Paper Association Elects Beier President—S.A.P.I. To Hear Cobean Speak—Other Trade News.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., December 12, 1938—While certain lines are showing strength following weaknesses of a few weeks ago, the local general paper market is reflecting the customary pre-inventory quietness with demand slackening up as buyers strive to present as low an inventory as possible. However, there are distinct signs reported of a more healthy demand shortly after the first of the year and numerous statements indicate that Chicago executives are hopeful that 1939 will be productive of more profitable merchandising rather than a continuance of the current situation wherein production is up, demand good and prices at points where little or no profit is possible.

Specifically, sulphite papers had a good week as buyers came into order following the strengthening of last week. Books and covers were in demand with those lines dealing specifically with advertising promotions showing that general business is fairly optimistic over the immediate outlook. Krafts were little changed although certain factors of balance are reported which indicate a more profitable sales program next year. Groundwoods are reported in fair shape. Specialties are finding the Christmas business comparatively good and expected to improve as the weather becomes more seasonal. Newsprint commitments for 1939 are reported to indicate a more healthy position in that line. Waste papers are characterized as "soft" locally, with little demand and most lines quite available.

Paper Association Elects Beier President

Once a president makes a good record they do not forget him at the Chicago Paper Association. At the November meeting of the energetic coarse paper group, Earl Beier of Beier & Company, was elected president and William Chukerman was given the vice-presidency. Both have served as presidents of the Association in the past, Mr. Beier about six years ago and Mr. Chukerman up until the time that retiring president Henry Thoms was elected. R. E. Knox & Schneider, was elected second vice president and John L. Richey was re-elected secretary-treasurer. Mr. Richey showed his capabilities, both past and present, by arranging a most interesting educational program wherein G. E. Mix of the Odman Corporation, presented a picture of their inventory checking procedure. Following the presentation, a round table discussion was featured with methods of accurate inventory and daily basis keeping in the foreground. The popularity of this type of meeting, in which there was a generous participation, seems to indicate that educational programs of this type are likely to be followed in the future.

Oppose State Wage-Hour Proposal

Manufacturers, jobbers, retailers and service groups are getting ready to make a strong fight against proposed State Wage-Hour legislation which the United States Department of Labor has prepared for enactment in the various States. The "model" bill which has been circulated around is very similar to the Federal Act and sentiment in Illinois is strongly opposed to its enactment not only as a matter of principle but out of regard for the fact that such a move would be unwise until the Federal Act is thoroughly tested legally and until many perplexities which it presents are clarified. The market difference between retail and service employment and factory employment is also to be projected prominently into Illinois opposition to the State version of the Act.

Midwest S.A.P.I. To Hear Cobean

The midwest division of the Salesmens Association of the Paper Industry plans to inaugurate the new year in impressive style. Monday, January 9, has been set as the tentative date for the appearance of George Cobean, president of the National Paper Trade Association, as the guest speaker. The Butler Paper executives will be the guest of the sales executives at a type of meeting which the Association hopes to hold at frequent intervals during the next twelve months. While no set subject has been given for Mr. Cobean's remarks and it is reported that the session will be really a "get acquainted" affair, his recent statements concerning the new obligations of the paper industry with reference to the present economic picture, unemployment and employee relations are likely to bring out a record attendance. Meanwhile, the Salesmens Association has definitely announced that its annual Christmas party will be held at the Hotel Sherman on Wednesday noon, December 28, with Ben Babbitt of the Brown Company again doing the honors as the general chairman of what always winds up as one of the outstanding events of its kind in this vicinity.

Employment and Pay Rolls Up in October

The most recent employment survey conducted by the Illinois Department of Labor and dated November 28, based on October reports, shows a contra-seasonal increase in the paper goods, printing and publishing business in the State. There is a less than seasonal increase in payrolls. Employment increased 0.9 per cent over the previous September-October period while payrolls were upward 3.5 per cent. The fifteen year average September-October changes shows a 4 per cent decline in employment but a 2.8 per cent increase in payrolls. With reference to the paper goods, printing and publishing group, the report says that "all classifications, except bookbinding and publishing which reduced employment but increased total wage payments, contributed to the increase in employment and payrolls shown.

Marvellum Issues Greeting Card Book

The Marvellum Company, Holyoke, Mass., has issued a book containing suggestions of some of the better papers for greeting card work.

Program for 1939 Salesmen's Study Course

Philadelphia Paper Trade Association Announces Third Year of Practical Instruction For Paper Salesmen With Prize Contest Open To Merchant Salesmen—Prominent Salesmen Will Cooperate To Aid Students.

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., December 12, 1938.—The program for the Salesmen's Study Course, an activity of the Philadelphia Paper Trade Association, is well under way. This course, which was inaugurated three years ago, and has attracted widespread attention, will differ from the preceding ones in that as a result of a contest conducted by the Association, which contest was open to every merchant salesman in the country selling either fine or coarse paper who submitted the best "case history" in his experience, $120.00 in prizes will be awarded to the twelve contestants whose papers are considered best in the decision of the judges who have been selected by the Philadelphia Paper Trade Association.

The sessions will be held at Franklin Institute, 20th Street and Parkway at seven o'clock every other Tuesday for ten Tuesdays commencing January 17th.

Course Planned For Practicability

It is interesting to note in the Foreword of the Prospectus, which epitomizes the unusual proceedings of this educational activity, the difficulties experienced by those in charge of arranging the program. This Foreword reads as follows:

"This 1939 Sales Study Course has been far more difficult to plan than the preceding ones. When we asked the 1938 class for suggestions for 1939, almost unanimously you answered—'Tell Us How To Sell More Paper'. To meet your wishes we have planned accordingly. The committee realized that the information and help you were seeking must be along broad and specific lines, not theory or formulae—but *how*.

Ten Demonstrations on Salesmanship

"The 1939 Course, consisting of ten demonstrations, is well named—Sell More—Earn More. Part of the meetings will be given to talking pictures illustrating vital every-day sales problems, the solution, and then the interpretation of these solutions in terms of paper selling. The talking picture part of these meetings have been expressly prepared by J. E. Borden, a salesman of national reputation, sales promotion director of the Borden Company, and vice-president of the Sales Executives Club of New York. He is in close touch with sales problems of all kinds, knows the answers and has given us material that we can use profitably. Mr. Borden's motto as sales manager, is 'Get Results by Method-Explaining and Example-Giving. Do not Show a Salesman Up, *Show Him How.*' Right from the firing line these fast moving films—talking slide formulae will bring you vivid and authentic accounts of actual sales making methods used by top-flight salesmen. Be a winner—Do as winners do.

Prominent Salesmen Will Aid Students

"The second part of the meeting will be taken in hand by salesmen of national reputation, whose help and cooperation it has been our good fortune to secure; they will interpret the principles illustrated in the films and show you how you can apply them to your daily job of selling.

"The course is presented with a keen feeling of enthusiasm for its helpfulness to everyone engaged in the business of selling paper."

Committee of Salesmen's Study Course

The committee in charge of the Salesmen's Study Course is as follows: William A. Hentz, Sales Manager, Thos. W. Price Co., chairman; Ormond Freile, Vice-president, Paper Merchants, Inc., Joseph H. Miller, Vice-president, Garrett-Buchanan Co., W. B. Killhour, President, Quaker City Paper Co., and Doris E. Lewis, Executive Secretary, Paper Trade Association of Philadelphia, registrar, 355 Drexel Building, Philadelphia.

November Newsprint Statistics

Production of newsprint in Canada during November 1938 amounted to 245,295 tons and shipments to 264,421 tons, according to the Newsprint Service Bureau. Production in the United States was 78,390 tons and shipments 76,278 tons, making a total United States and Canadian news print production of 323,685 tons and shipments of 340,699 tons. During November, 29,644 tons of news print were made in Newfoundland, so that the total North American production for the month amounted to 353,329 tons. Total production in November 1937 was 410,048 tons.

The Canadian mills produced 939,578 tons less in the first eleven months of 1938 than in the first eleven months of 1937, which was a decrease of twenty-eight per cent. The output in the United States was 120,581 tons or thirteen and nine tenths per cent less than in the first eleven months of 1937, and in Newfoundland 83,238 tons or twenty-five and six tenths per cent less, making a total decrease of 1,143,397 tons, or twenty-five and two tenths per cent.

Stocks of news print paper at the end of November were reported at 177,157 tons for Canadian mills and 20,702 tons for United States mills, making a combined total of 197,859 tons compared with 214,873 tons on October 31, 1938.

Waite-Worth Nuptials

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 12, 1938—Harrie E. Waite, for 30 years in an executive position with John Carter & Co., Inc., well and favorably known in the trade, and Mrs. Minnie H. Worth were quietly married at Mr. Waite's home 47 Hillside road, Watertown, Mass., December 3. Sons and daughters of each were present at the ceremony. Mr. and Mrs. Waite are living at 47 Hillside road.

By International Agreement

STONITE* Rolls

TOP PRESS AND SMOOTHING

★ (*Ebonite and Granulated Stone Composite U. S. Patent 1,787,890 Re. 18,111*)

THE CHOICE OF 31 PAPERMAKING NATIONS

1577 Stonite* Rolls in service throughout the world are convincing proof of the operating advantages claimed for Stonite.* Briefly stated, these advantages are:

1. *Improved surface finish*
2. *Freedom from two-sidedness*
3. *Greater safety and efficiency*
4. *Greatly reduced pick-up and number of breaks.*

May we quote actual experiences of mills making grades and weights like yours?

STOWE-WOODWARD, INC. NEWTON UPPER FALLS • MASS.
NEW YORK OFFICE • WOOLWORTH BLDG.

Makers of WHITE STAR *Rubber Covered Rolls,* TANNITE *Couch Rolls*
STONITE *Top Press and Smoothing Rolls—All by the* COREWELD *Process*

Stowe-Woodward Rolls are made on the West Coast by HUNTINGTON RUBBER MILLS, INC., *35 West Lander St., Seattle, Washington*

Financial News of Pulp and Paper Industry

H. S. Lewis Becomes A Principal Stockholder of Cellulose Products Corp.—Abitibi Earnings For November Expected To Show New Peak—Dexter Sulphite Pulp Negotiations With Canadian Interests Continue.

NEW YORK STOCK EXCHANGE

High, Low and Last for the Week Ending December 14, 1938

	High	Low	Last
A. P. W.	2⅜	2⅛	2⅛
Armstrong Cork Co.	54	50	54
Celotex Corp.	18½	15⅛	18½
Celotex Corp., pf.	70	67¾	70
Certain-Teed Products Corp.	11	9⅜	11
Certain-Teed Products Corp., pf.	41½	40	41
Champion Paper & Fibre Co.	28½	26	28½
Champion Paper & Fibre Co., pf.	102¾	102¼	102½
Congoleum-Nairn Co.	27¾	26	27¾
Container Corp. of America	14¾	13⅜	14¾
Continental-Diamond Fibre Co.	9⅜	8⅜	9¼
Crown-Zellerbach Co.	13⅝	12⅝	13⅛
Crown-Zellerbach Co., pf.	87⅛	85⅞	86½
Flintkote Co.	29½	25⅝	29¼
Robert Gair	3¾	3½	3⅝
Robert Gair, pf.	12⅛	11½	12
International Paper & Power	14¼	12⅜	14¼
International Paper & Power, pf.	49¾	44½	49¾
Johns-Manville Corp.	106	100¼	106
Johns-Manville Corp., pf.	128	128	128
Kimberly-Clark Corp.	25½	25	25
MacAndrews & Forbes	28⅞	28¼	28⅞
Masonite Corp.	54¾	53	54¾
Mead Corp.	11⅜	10¾	11½
Mead Corp., pf.	66	65	65
Paraffine Companies, Inc.	58½	58	58½
Paraffine Companies, Inc., pf.	100	100	100
Ruberoid Co.	31¾	29¼	31¾
Scott Paper Co.	48½	48½	48½
Sutherland Paper Co.	30	29	30
Union Bag & Paper Corp.	12½	11¾	12
United Paperboard Co.	7¼	7	7
U. S. Gypsum Co.	111	108¼	110½
U. S. Gypsum Co., pf.	173	172	173

NEW YORK CURB EXCHANGE

High, Low and Last for the Week Ending December 14, 1938

	High	Low	Last
American Box Board Co.	9¼	9	9
Brown Co., pf.	20¼	20	20¼
Great Northern Paper	37¾	37¼	37¾
St. Regis Paper Co.	3	2¾	3
St. Regis Paper Co., pf.	55	52½	52½
Taggart Corp.	4¾	4½	4¾

H. S. Lewis Becomes Stockholder

[FROM OUR REGULAR CORRESPONDENT]

WATERTOWN, N. Y., December 12, 1938—Following a meeting of the Cellulose Products Corporation here it was announced that Harry S. Lewis, head of the J. P. Lewis Paper Company, of Beaver Falls, had become a principal stockholder. For some time the concern had operated here under the name of the Joy Products Company. Since reorganization several months ago the production has grown steadily and the sales force is now being enlarged. The company is understood to have many orders which will probably result in starting another shift. A New York City sales office is now being established in charge of William A. Groat, a son-in-law of Mr. Lewis. The company manufactures absorbent hospital pads and similar products from sanitary cellulose fiber. A force of about 35 workers are now being employed which number will be increased in the near future.

New directors elected at the annual meeting include James S. Alexander, Dr. Norman L. Hawkins, Fred R. Calkins, W. A. Groat and Dickinson E. Griffith, general counsel of the J. P. Lewis branches, of Beaver Falls. Officers chosen for the year include Mr. Alexander as president and general manager; W. A. Groat, vice president, and D. E. Griffith, secretary and treasurer. The capitalization remains at $50,000, all common stock of which no more is being offered for sale. The plant and officers will remain in this city and the connection of Mr. Lewis with the concern is pointed to as significant that brilliant prospects are ahead. The plant is now running on full time.

Abitibi Earnings Rise

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., December 12, 1938—It is believed that the earnings of the Abitibi Power & Paper Company, Limited, Toronto, for the month of November will show a higher sum than for October and a new peak for the year to date. During half of the current fiscal year Abitibi operated at less than half of its effective capacity, obsolete plants of the company not being taken into consideration. Indications are that the rate for the full year, 1938, will approximate 53 per cent of effective capacity. Nevertheless earnings available for depreciation and interest in the first ten months were $2,307,733. If October earnings are maintained in the two final months (and indications are that they will), total net available for interest and depreciation will be close to $3,050,000. Allowing $1,785,000 for depreciation, the residue available for interest on bonds presently outstanding would be $1,148,000 equal to 2.38 per cent on the $48,267,000 5s.

Dexter Negotiations Still Pending

[FROM OUR REGULAR CORRESPONDENT]

DEXTER, N. Y., December 12, 1938—Following a meeting of directors of the Dexter Sulphite Pulp and Paper Company last week is was stated that opportunity was given Mrs. F. E. Campbell and Mrs. A. M. Campbell, widows of former owners, and the First National Bank, of Dexter, to submit a proposition by this week to purchase the debenture notes of the Northern New York Trust Company, the Jefferson County National Bank, the Watertown National Bank, and other holders. It was said that the three banks, largest of the debenture note holders, had agreed to turn over their notes at fifty cents on the dollar. The other creditors holding the balance of the $371,000 of debenture notes have not expressed such an agreement. Meantime word was received that negotiations with Canadian interests for purchase of the property are still pending. The plan to receive a proposition from the Campbells and the Dexter bank is in the hope of working out some arrangement to keep the mill in operation.

Badger Paper Asks Delisting

WASHINGTON, D. C., December 12, 1938—The Securities and Exchange Commission has called a hearing on January 4 in Chicago on an application by the Badger Paper Mills, Inc., to withdraw its no-par value common stock from listing on the Chicago Stock Exchange. The application said there had been no trading in the security on the Exchange since it was listed and that the expense of continuing such listing was unwarranted.

BELOIT IRON WORKS

BELOIT WISCONSIN

BELOIT IRON WORKS PAPER MACH'Y BELOIT WIS.

Government Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., December 14, 1938—The Government Printing Office has announced the following paper awards.

Aetna Paper Company will furnish 23,625 pounds (250,000 sheets) of 25% rag, blue bond paper, 34 x 40 94½ lbs., at 9.24 cents. L. Hyman & Sons will furnish 16,000 pounds (100,000 sheets) of 25 per cent rag, white blotting paper, 19 x 24, 160 lbs., at 5.8 cents. Aetna Paper Company will furnish 93,500 pounds (1,000,000 sheets) of 25 per cent rag, white bond paper, 32 x 42, 93½ lbs., No. 26 at 8.918 cents and the same company will furnish 8,150 pounds (100,000 sheets) 25 per cent rag, yellow bond paper 28 x 34, 81½ lbs., No. 32 at 8.09 cents. Bids for these items were received on November 28.

R. P. Andrews Paper Company will furnish 6,000 sheets of Whiting's woven linen azure note paper, 14 x 8⅞ inches at $25.50 per M sheets and the same firm will furnish 6,000 same linen envelopes at $17.50 per M. Walker Goulard Plehn Company will furnish 48,000 pounds (200,000 sheets) No. 2 kraft wrapping paper, 36 x 48 inches at 3.36 cents and the same firm will also furnish 10,000 pounds, No. 2 same in 48 inch rolls at 3.11 cents. Mudge Paper Company will furnish 5,000 pounds (200,000 sheets) of 50 per cent rag, pink manifold paper 21, 32, 25 lbs., at 16.73 cents. Bids for these items were received on November 25.

Whitaker Paper Company will furnish 40,000 pounds No. 32, yellow sulphite writing paper in 32 inch rolls at 5.23 cents. Cauthorne Paper Company will furnish 100,000 sheets of 22 x 34 inch white gummed paper at $9.69 per M sheets. Stanford Paper Company will furnish 30,000 pounds (150,000 sheets) of 19 x 24 inch moss green desk blotting paper at 4,686 cents. Bids for these items were received on November 21.

R. P. Andrews Paper Company will furnish 5,000 pounds oiled manila tympan paper in 48 inch rolls at 6.5 cents. Barton, Duer & Koch Paper Company will furnish 23,025 pounds (75,000 sheets) of 50 per cent rag, lithograph finish map paper, 41 x 50 inch, 307 pounds at 10.22 cents. Bids for these items were received on November 18.

Paper Corporation of U. S., will furnish 5,000 pounds (108,000 sheets) of 28 x 34, 46 lbs., yellow sulphite manifold paper at 7.85 cents. Barton Duer & Koch Paper Company will furnish 11,850 pounds (125,400 sheets), of 34 x 40, No. 26, 25 per cent rag, blue bond paper at 9.98 cents. Bids for these items were received on November 16.

Barton, Duer & Koch Company will furnish 35,190 pounds (100,000 sheets) various sizes 100 per cent rag, white chart paper, lithograph finish, at 17.3 cents, bids for which were received on November 14.

The same firms will also furnish 76,840 pounds (340,000 sheets) of 50 per cent rag, white index paper, 24½ x 32½, 226 lbs., at 8.91 cents, bids for which were received on November 9.

Walker, Goulard Plehn Company will furnish 22,761 pounds (54,000 sheets) and 3,338 pounds (15,000 sheets), 50 per cent rag, lithograph finish map paper 44 x 64 inch and 40 x 52 inch, both at 10.42 cents. Enterprise Paper Company will furnish 16,900 pounds (100,000 sheets) of 28 x 41, 169 lbs., dull coated book paper at 6.75 cents. Barton, Duer & Koch Paper Company will furnish 67,800 pounds (300,000 sheets) of 24½ x 32½, 228 lbs., white sulphite index paper at 5.17 cents. Bids for these items were received on November 7.

Stanford Paper Company will furnish 38,500 pounds (250,000 sheets) 38 x 48, 154 lbs., M. F. book paper at 5.12 cents. R. P. Andrews Paper Company will furnish 500 sheets, 24 x 38, paraffin kraft wrapping paper at $6.75. Stanford Paper Company will furnish 48,000 pounds (200,000 sheets) of 38 x 50, 240 lbs., supercalendered book paper at 5.12 cents. Marquette Paper Company will furnish 74,800 pounds (800,000 sheets) 32 x 42, 93½ lbs., white sulphite writing paper at 5.43 cents. Bids for all of these items were received on November 4.

Barton, Duer & Koch Paper Company will furnish 9,750 pounds (300,000 sheets) of 100 per cent rag, 21 x 32, 32½ lbs., white manifold paper at 23.25 cents. Stanford Paper Company will furnish 12,600 pounds (150,000 sheets) of 24½ x 32, 84 lbs., pink mimeograph paper at 5.74 cents. Whitaker Paper Company will furnish 135,000 pounds (15,000,000 sheets) of 8 x 10½, 9 lbs., white mimeograph paper at 5.16 cents. Bids for these items were received on November 2.

Whitaker Paper Company will furnish 97 lbs., of 50 per cent rag, white waterproof ledger paper, 17 x 22, 64 lbs., at $45. Same firm will also furnish 5,000 pounds (25,000 sheets) of 19 x 24, 200 lbs., blue desk blotting paper at 5.23 cents. Bids for these items were received on October 31.

R. P. Andrews Paper Company will furnish 4,190 sheets, 20 x 25 inch blue gummed paper at $8.29 per M sheets. Mathers-Lamm Paper Company will furnish 210 sheets, 17 x 23 inch white glasine paper at $7.80. Bids for these items were received on October 28.

R. P. Andrews Paper Company will furnish 2,170 pounds (1,000 sheets) of 28 x 40 best quality binders board at 5 cents, bids for which were received on October 26.

The Office has received the following bids for 44,400 pounds (300,000 sheets) of 36 x 48 inch green sulphite paper; Marquette Paper Company, 5.46 cents; Mudge Paper Company, 5.57 cents; Stanford Paper Company, 5.8 cents; Whitaker Paper Company, 5.43 cents; Barton, Duer & Koch Paper Company, 5.59 cents; R. P. Andrews Paper Company, 6.05 cents; Cauthorne Paper Company, 5.679 cents; Aetna Paper Company, 5.97 cents; Mathers-Lamm Paper Company, 5.58 cents; and Walker, Goulard Plehn Company, 5.8 cents.

For 5,000 sheets of 24 x 36 inch brown cloth lined paper; Andrews Paper House of York, $123.49 per M sheets; Virginia Paper Company, $135.00; R. P. Andrews Paper Company, $127.20; Mathers-Lamm Paper Company, $123.50; Walker, Goulard Plehn Company, $126.00 less 2 per cent; Barton, Duer & Koch Paper Company, $123.50; Whitaker Paper Company, $122.88; Nashua Gummed & Coated Paper Company, $126.67 less 2 per cent; Mudge Paper Company, $123.03; Old Dominion Paper Company, $128.49; and Cauthorne Paper Company, $134.00.

For 81,992 pounds (554,000 sheets) of 32 x 54

SIAMESE
"TOUR BOSS"
DRYER FELT

Patent applied for

Makes friends fast

A BETTER PRODUCT AT LESS EXPENSE

WILLIAM L. BARRELL CO.
LAWRENCE, MASS.

AGENTS

Williams-Gray Co., Chicago, Ill.

F. A. Leavens & Co., Inc. Neenah, Wisc.

W. C. Stebbins Co., Inc. Watertown, N. Y.

Chase & Cooledge Co. Holyoke, Mass.

For full information please sign and mail this section to us.

William L. Barrell Co.
Lawrence, Mass.

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inch green sulphite writing paper; Marquette Paper Company, 5.46 cents; Graham Paper Company, 5.5 cents; Barton, Duer & Koch Paper Company, 5.59 cents; R. P. Andrews Paper Company, 6.05 cents Whitaker Paper Company, 5.43 cents; Cauthorne Paper Company, 5.679 cents; and Aetna Paper Company, 5.97 cents.

For 35,000 pounds (125,000 sheets) of 22½ x 28½ inch jute tag board; Whitaker Paper Company, 7.55 cents; and Mudge Paper Company, 7.55 cents.

For 33,800 pounds (200,000 sheets) of 28 x 41 inch dull coated book paper; Virginia Paper Company, 11.85 cents; Enterprise Paper Company, 11.849 cents less 1 per cent; Barton, Duer & Koch Paper Company, 11.62 cents; Stanford Paper Company 6.67 cents; Whitaker Paper Company, 11.7 cents; and Walker, Goulard Plehn Company, 6.67 cents.

For 7.040 pounds (27,500 sheets) of 38 x 40 inch, 50 per cent rag, white M. F. lithograph paper; Mathers-Lamm Paper Company, 5.5 cents; R. P. Andrews Paper Company, 9 cents; Aetna Paper Company, 9.47 cents; Walker, Goulard Plehn Company, 9.8 cents.

For 19.400 pounds (200,000 sheets) of 32 x 48 inch light weight M. F. book paper; Old Dominion Paper Company, 5.81 cents; Stanford Paper Company, 5.82 cents; Barton, Duer & Koch Company, 5.64 cents; Graham Paper Company, 5.64 cents; and Walker, Goulard Plehn Company, 5.64 cents.

For 10,000 pounds (38,000 sheets) of 38 x 38 inch chemical wood manila paper; Old Dominion Paper Company, 5.74 cents; and Barton, Duer & Koch Paper Company, 5.5 cents.

PULP PRODUCTION SHOWS GAIN

(Continued from page 13)

exceeded the 1935 figure, $167,208,261, by 47.8 per cent.

The total production of pulp (wood and other fiber) increased from 5,032,299 tons, valued at $165,322,871, in 1935 to 6,757,842 tons, valued at $244,667,297, in 1937, the rates of increase being 34.3 per cent for quantity and 48 per cent for value.

The total consumption of pulpwood in 1937 amounted to 10,393,800 cords, costing $82,884,799, of which 6,934,234 cords, costing $52,228,129, were contributed by yellow pine, and domestic spruce and hemlock.

This industry, as classified for Census purposes, embraces establishments engaged primarily in the production of pulp from wood and other fiber. The greater part of the pulp produced is consumed by paper mills operated in conjunction with pulp mills.

Statistics for 1937, with comparative figures for earlier years, are given in the following tables. Table 1 gives summary statistics for 1937, 1935, and 1933, table 2 shows the production of pulp by kind and value, for 1937 and 1935, and table 3 shows the pulpwood consumption by kind of wood, quantity, and cost for the same years. All figures for 1937 are preliminary and subject to revision.

Hercules To Build Ethyl Cellulose Plant

The first step in an expansion program for the manufacture of ethyl cellulose is announced by officials of Hercules Powder Company. Work will begin at once on the construction of a new ethyl cellulose plant at Hopewell, Va. At the present time, Hercules ethyl cellulose is manufactured in a plant at the Hercules Experiment Station, near Wilmington, Delaware. Transfer of all ethyl cellulose manufacturing activties to Hopewell will be made as soon as the new plant is completed. The new unit provides Hercules with increased production facilities to keep pace with the growing demand for ethyl cellulose.

According to M. G. Milliken, general manager of the Cellulose Products Department, Hopewell will prove an ideal location for the manufacture of ethyl cellulose.

Ethyl cellulose, in the opinion of competent observers, is one of the most promising new materials introduced in the United States in recent years. It is used in lacquers, varnishes, plastics, synthetic finishes, textiles, films, paper, and many other products.

One of its most important properties is that it retains flexibility at extremely low temperatures. For example, at the Chemical Show in New York, last year, films of ethyl cellulose were flexed all week over dry ice at a temperature of minus 78.9 degrees centigrade.

Ethyl cellulose is much lighter in weight than other cellulose compounds. It is unusually tough, resists alkalies and weak acids, is widely soluble in most solvents, and is non-flammable. Recognition of these properties by industry is responsible for the construction of the new plant by Hercules.

TABLE III.—PULPWOOD CONSUMPTION—QUANTITY AND COST, BY KIND OF WOOD: 1937 AND 1935

Kind of wood	1937		1935	
	Cords	Cost	Cords	Cost
Total	10,393,800	$82,884,799	7,628,274	$58,243,652
Spruce:				
Domestic	2,010,720	21,980,698	1,755,112	17,906,240
Imported	826,528	10,743,365	625,462	7,835,799
Yellow pine, Southern	2,658,949	14,498,259	1,785,228	8,527,145
Hemlock:				
Domestic	2,264,565	15,749,172	1,521,271	10,234,560
Imported	37,447	280,575		
Poplar:				
Domestic	441,401	3,899,639	333,773	2,661,247
Imported	90,365	960,930	54,283	604,664
Balsam fir:				
Domestic	320,715	3,269,690	298,812	2,597,798
Imported	71,447	767,243	54,313	583,266
Jack pine, domestic and imported	300,786	2,863,084	[1] 224,538	[1] 1,779,425
Beech, birch, and maple	257,410	2,302,036	152,054	1,280,443
White fir, domestic and imported	135,384	769,446	[1] 174,075	[1] 880,728
Red gum	25,967	165,750	[2] 29,299	[2] 191,893
Tamarack (larch)	8,945	84,057	9,587	69,638
Cottonwood	64,035	432,366		
Yellow poplar	47,882	435,966	317,675	1,867,727
Douglas fir	45,665	184,948		
Other woods [3]	220,198	1,494,497		
Slabs and mill waste	565,391	2,003,078	292,792	1,223,079

[1] Domestic only.
[2] Reported as "Gum" for 1935.
[3] For 1937, domestic ash, basswood, black gum, chestnut, elm, oak, and miscellaneous hardwoods not reported separately. For 1935, see published report.

Prohibit Price Fixing on Paper Trays

The Federal Trade Commission has issued an order prohibiting 17 manufacturers of paper, pulp and wooden dishes or trays from unlawfully fixing prices for the sale of their products in violation of the Federal Trade Commisison Act. Such products are used principally by groceries, delicatessen stores and meat markets as containers for foods.

Food Dish Associates of America, an unincorporated trade association whose activities as such terminated in May, 1937, and its secretary and treasurer, Allan P. Durgin, also are respondents. During its existence the association had its office at 285 Madison avenue, New York. Its membership was changed from time to time, but at the times mentioned in the findings it included the following respondent manufacturers named in the proceeding:

Champion No-Leak Paper Dish Company, 931 Brown avenue, Toledo, Ohio; Southern Champion Tray Company, Chattanooga; Keyes Fiber Company, Waterville, Me.; Steele-Wallace Corporation, 2000 Hanley Road, St. Louis; Berst-Forster-Dixfield Company, 1602 Graybar Building, New York; Stevens & Thompson Paper Company, North Hoosick, N. Y.; Oval Wood Dish Corporation, Tupper Lake, N. Y.; F. M. Longnecker, Delta, Ohio, trading as Paper Food Trays Company; Crescent Paper Dish Company, Inc., 505 Johnson street, Brooklyn; the Standard Carton Company, 2611 Pacific avenue, Tacoma, Wash.; the Paper Specialty Corporation, 9th and Irving streets, Portland, Ore.; St. Joe-Mullen Container Corporation, St. Joseph, Mich.; Paper Plate and Tray, Inc., 222 West Adams street, Chicago; Sanitary Container Corporation, 38 South Cruse street, Indianapolis; American Paper Specialty Manufacturing Company, Pittsburgh; Lincoln Box Company, Merrill, Wis.; and Newark Paper Company, 139 Plymouth street, Brooklyn.

John M. Hart Company, Graybar Building, New York, sales agent for Keyes Fiber Company, also is named as a respondent.

In the sale and distribution of their products, the respondents are directed to cease and desist from fixing or maintaining the prices, whether uniform or otherwise, at which their products are thereafter to be sold, and from doing any act or thing for the purpose of executing any agreement, understanding, arrangement or conspiracy to fix or maintain such prices, including the establishment of a price zoning system.

The order also prohibits the respondents from receiving and exchanging price lists exhibiting the prices, whether uniform or otherwise, at which their commodities thereafter are to be sold, and from collecting and disseminating among themselves either directly or indirectly or through any one of them information with the purpose and effect of fixing or maintaining prices on such products, whether uniform or otherwise, and whether through discounts, zones, or any other method.

Findings are that Food Dish Associates of America, formed in 1933 for the purpose of serving as a clearing house for its members, with their joint cooperation engaged in attempts to stabilize and supervise production and distribution in their industry; to collect from and disseminate among the members, trade statistics, including the prices at which their products were being sold; to fix prices, and otherwise to promote the common business interests of the members for their mutual profit and advantage. The Commission found that in July, 1936, the association became inactive and all members dropped out except eight, who reorganized it, with Allan P. Durgin acting as secretary and treasurer, and continued the association until about May 1, 1937, when its activities were terminated.

In March, 1937, according to the findings, 11 of the respondent manufacturers entered into an agreement to retain Gooch & Co., Inc., a New York concern, also named as a respondent, for counselling work and as a clearing house and intermediary for the respondents and for maintaining contact with other members of the industry not parties to the agreement. Findings are that from March 24, 1937, to the time of filing complaint in this proceeding, practically all the respondent manufacturers for a time filed their current price lists, which were to be maintained until further lists were filed, with Gooch & Co., and for a part of the time products were actually sold and delivered in accordance with such prices.

The price-fixing activities were found to have been engaged in during the code period and thereafter, at one time or another, up to May 1, 1937, by all the respondents except Gooch & Co. and Newark Paper Company. The latter company joined the other respondents in the agreement with Gooch & Co. effective between May 24, 1937, and issuance of the complaint, according to the findings.

Karl Mathie Dead

[FROM OUR REGULAR CORRESPONDENT]

WAUSAU, Wis., December 12, 1938—Karl Mathie, who was one of the organizers of the Marathon Paper Mills Company, Rothschild, Wis., and the Mosinee Paper Mills Company, Mosinee, Wis., died Friday, December 9, at Los Angeles, Calif. He had left Wausau the previous week. Mr. Mathie was 72 years old, and was stricken with a heart attack.

Although Mr. Mathie was not active in the management of the paper mills mentioned, he was on the board of directors of each for a number of years, and was recognized as a leading industrialist of the Wisconsin River Valley. He was a graduate of Lawrence College, Appleton, Wis., and studied for a year at Harvard. He was a trustee of Lawrence from 1909 to 1934. He spent a short time in the ministry at Appleton, Wis., and Miami, Fla., and was superintendent of schools at Wausau for ten years. He was a thirty-second degree Mason, a Rotarian, and a prominent member of the Universalist Church. He was also active in politics, and engaged in unsuccessful campaigns for governor and congressman on the Democratic ticket.

Mrs. Mathie accompanied the body back to Wausau, where funeral services were to be held this week. Besides the widow, he is survived by two daughters, Mrs. Earl Tippett of Milwaukee, Wis., and Mrs. James Bell of New Rochelle, N. Y.

To Break Ground for Southland Mills

A press dispatch from Dallas, Tex., says that "Ground will be broken immediately after the New Year for construction of the newsprint mill of Southland Paper Mills, Inc., according to E. L. Kurth, president of the company. It is expected that the mill will be in operation some time in 1940."

Delaware Valley TAPPI Discusses Vapor Permeability

The Delaware Valley Section of the Technical Association of the Pulp and Paper Industry met at the Philadelphia Engineers Club on December 9 spending a very interesting evening discussing a top-notch subject, which is occupying the attention of the Paper Technicians to a marked degree, particularly in the last few years.

Chairman C. M. Connor after a few brief remarks entered into the topic of the evening by introducing the speaker, Dr. Nelson Allen, Supervisor of Analytical Research of the Rayon Department and Cellophane Division of the E. I. duPont de Nemours & Company of Buffalo, New York, who delivered an address entitled "Testing and Evaluation of Moisture—Vapor Permeability."

The marked discussion of this address signified the interest of the members and guests present in this subject and the following took a lead in these discussions: C. M. Connor, Valley Forge Laboratories; Dr. Joseph D. Clarke; G. L. Schwartz of the duPont Company; Wm. M. Lee and Mr. Wagner of T. M. Royal Company; Ward Harrison of Riegel Paper Corporation and J. F. Halladay of Container Corporation of America.

Those in attendance were: J. R. Atwater, M. Middleton, S. G. Briscoe, H. J. Farra, R. J. Stuart, Jr., George Johnson, R. M. Bates, E. J. Stokes, J. J. Lafferty, J. C. Schmidt, Alex McInnes, Jr., W. E. McEwen, Sam Reynolds, J. F. Halladay, H. H. Hanson, G. L. Schwartz, C. M. Connor, Nelson Allen, W. E. Brow, A. R. Boyd, A. M. Cooper, J. C. Shaw, R. W. K. Ulm, H. C. Speel, R. Max Goepp, Jr., V. F. Waters, A. J. Arsenault, E. G. Almy Walter Wolf, W. C. Griffin, J. D. Davis, A. E. Griffin, F. J. McAndrews, H. L. Becher, M. Rueben, M. Carig Maxwell, L. Austin, J. D. Miller, James H. Fritz, Harold Knight, P. M. Loddengaard, L. Edwards, Ward Harrison, John Traquair, C. Anderson, R. T. Bingham, A. F. Pittroff, W. E. Greene, Harry Hulndes, J. N. Tuttle, F. P. Thornton, A. Schnabel, C. M. Schermerhorn.

To Issue Advertising Announcements

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 12, 1938—Within the next week or two Carter, Rice & Co. will distribute to the New England printing trade large folders showing the direct advertising announcements of the Rising Paper Company, Housatonic, Mass., and of the Strathmore Paper Company, West Springfield, Mass. These announcements will contain blank and printed forms, accompanied by a price sheet giving the complete lines.

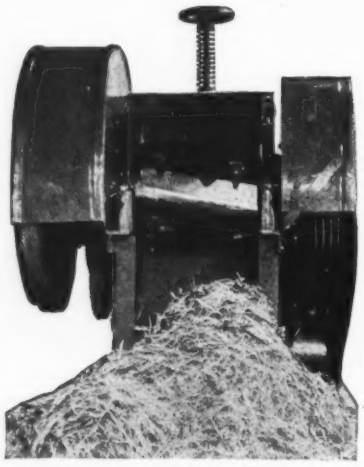
S. L. Bush Goes With Nation Wide Papers

BOSTON, Mass., December 12, 1938—Streeter L. Bush, since 1933 assistant sales manager of the wrapping paper department of Carter, Rice & Co., is relinquishing this position as of December 13, 1938, to accept a position of responsibility with Nation Wide Papers, Inc., of Chicago, Ill. Mr. Bush has many friends who wish him the greatest possible success in his new duties.

Shredded Paper Uses Increasing

Due to its cleanliness, ease of handling, good appearance and customer acceptance, shredded paper is becoming increasingly popular. The success with which shredded newspapers are used has led many firms to look for still better paper excelsior but at reasonable prices.

Shredded news, selling at about one cent per lb., costs the producer around $7.00 per ton in fair quantities for the raw material and those producing reasonable amounts have cut the cost of shredding and baling to about $2.00 per ton. However, it is so definitely a "waste paper" that it does not satisfy those packing "quality" products.



INDUSTRIAL SHREDDER

There are many types of paper seconds which can be economically shredded—waxed papers, tissue, kraft, newsprint, crepe, even cellophane and sold at prices ranging from 3 cents per lb. upward. It makes little difference whether the paper is in rolls, sheets or even crumpled, today's shredding machines have been developed to the point where they are virtually universal.

Illustrated herewith is a popular machine which will handle a very wide range of papers and produce up to 1200 lbs. of ¼-inch shreds per hour. The machine can be adjusted easily to cut ½, ¼, ⅛ or 1/16-inch shreds. Only 2 to 3 hp. is required and the machine is easily moved out of the way when not in use. The manufacturers, the Industrial Shredder and Cutter Company, 707 South Ellsworth Street, Salem, Ohio, are pleased to shred and return samples sent to them and give full details about the machine and production methods.

Goes With West Carrollton Parchment

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 12, 1938—Philip H. Lane, formerly with Smith, Dee & Lane, mill agents, has been appointed sales manager of the New England district office of the West Carrollton Parchment Company, West Carrollton, Ohio, with headquarters at 10 High street, Boston.

Mr. Lane represents also the Michigan Carton Company, manufacturers of high grade folding boxes and display containers at Battle Creek, Mich.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Financing and Operation of Pulp and Paper Mills

General Construction News

Maspeth, L. I., N. Y.—The Anchor Container Corporation, 37-02 Northern boulevard, Long Island City, New York, manufacturer of corrugated boxes and containers, has arranged for lease in floor of building of the Ideal Chair Company, Grand street, Maspeth, totaling about 45,000 square feet of floor space, and will occupy at early date for new plant. Equipment and facilities will be installed for large production. It is expected to have the plant ready for service early in 1939.

Oil City, Pa.—The Continental Can Company, 100 East 42nd street, New York, N. Y., has awarded general contract to the Austin Company, 16112 Euclid avenue, Cleveland, Ohio, for erection of new plant at Oil City, to include a paper division and complete lithographing department, as recently noted in these columns. Company has secured tract of about 7½ acres of land at West First and Mineral streets for plant site. New mill will cost about $500,000. Work is scheduled to begin at once.

Syracuse, N. Y.—The Schiefer Folding Box Corporation, recently organized with capital of $26,000, plans operation of a local plant for the manufacture of a line of paper boxes and containers, folding cartons, etc. It is expected to begin production at early date. New company is represented by Hancock, Dorr, Ryan & Shove, Hills Building, Syracuse, attorneys.

Menasha, Wis.—The Wisconsin Container Corporation, Milwaukee and Sixth streets, manufacturer of folding and other corrugated boxes and containers, has plans for one-story addition to plant, for which superstructure will be placed under way soon. A permit has been issued. No estimated cost of new structure has been announced.

St. Paul, Minn.—The Minnesota Mining and Manufacturing Company, Forest and Fauquier streets, manufacturer of sandpaper and other abrasive papers, roofing specialties, has taken out a permit for new addition to mill, previously referred to in these columns, and will push erection to early completion. New unit will be four-story and basement, 103 x 165 feet, and will replace an existing structure at plant, known as building No. 1. It is estimated to cost about $250,000, with equipment, which will provide for extensive increase in output. William M. Murphy & Son, New York Building, have the general erection contract. Toltz, King & Day, Inc., Pioneer Building, St. Paul, is architect and engineer. William L. McKnight is president.

Hinsdale, N. H.—Fire recently damaged a portion of mill of the Robertson Company, Hinsdale, manufacturer of tissue and kindred paper stocks. An official estimate of loss has not been announced. The damage will be replaced.

Indian Orchard, Mass.—The Shawinigan Resins Corporation, 627 Worcester street, manufacturer of cellulose products, a division of the Monsanto Chemical Company, 1700 South Second street, St. Louis, Mo., has approved plans for new addition to mill, formerly the plant of the Fiberloid Corporation, acquired by the Monsanto company a number of months ago. New unit will be one-story, 33 x 101 feet, estimated to cost over $45,000, with equipment. Erection contract has been let to the Adams & Ruxton Construction Company, 1387 Main street, and work is scheduled to begin at once. Shawinigan company recently has developed a new sheet cellulose acetate material, glass-clear, to be used for transparent stiff and semi-stiff containers and boxes.

New Haven, Conn.—The Merit Paper Box Company, Inc., recently organized with capital of $50,000, is said to be planning early operation of a local plant for the manufacture of a line of paper boxes and containers. New company is headed by Paul Brown, 285 Edgewood avenue, and Salvatore Di Benedetto, 434 George street, both of New Haven.

Chicago, Ill.—J. H. Stone & Sons, 1815 West 74th street, manufacturers of corrugated boxes and containers, have awarded general contract to the B. W. Handler Construction Company, 1261 South State street, Chicago, for erection of new plant at 4150-70 West 42nd place, Central Manufacturing District, where company has selected a tract of land. Work will be placed under way at once. As recently noted in these columns, new plant will be one-story, 300 x 500 ft., covering entire site. It is estimated to cost approximately $500,000, with equipment. Company will remove present plant to new location and will install additional equipment and facilities for large increased capacity. Headquarters will be established in the new plant, where about 5000 square feet of floor space will be reserved for this purpose. A. Epstein, 2001 West Pershing road, Chicago, is architect and engineer.

New Companies

Mount Vernon, N. Y.—The Commercial Decal Products, Inc., has been incorporated with capital of 4500 shares of stock, no par value, to manufacture and deal in paper decalcomania transfers and allied paper specialties. New company is represented by S. V. Ryan, 184 State street, Albany, N. Y., attorney.

PAPER TRADE JOURNAL

ESTABLISHED 1872

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Henry J. Berger
EDITOR

Ronald G. Macdonald
Editor Technical Section

Lynne M. Lamm
Washington Correspondent

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COMING EVENTS IN PAPER INDUSTRY

AMERICAN PAPER AND PULP ASSOCIATION, Sixty-second Annual Convention and meeting, Waldorf-Astoria Hotel, New York. February 20-24.

TECHNICAL ASSOCIATION OF THE PULP AND PAPER INDUSTRY, Convention, Roosevelt Hotel, February 20-23.

SALESMEN'S ASSOCIATION OF THE PAPER INDUSTRY, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, Tuesday, February 21.

NATIONAL PAPER TRADE ASSOCIATION OF THE UNITED STATES, Convention, Waldorf-Astoria Hotel. New York. February 20-22.

NEW ENGLAND SECTION. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

DELAWARE VALLEY SECTION. Technical Association of the Pulp and Paper Industry—Second Friday of each month at the Engineers Club, Philadelphia, Pa.

LAKE STATES SECTION. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

KALAMAZOO VALLEY SECTION. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

PROGRAM OF PROGRESS

In the discussion of such a controversial subject as prosperity, with its complex economic and social aspects, spokesmen for this or that division too frequently view the broad question and problem too narrowly by emphasizing the relatively greater importance of this or that component part. Prosperity is so closely related to a high and wide distribution of earned wealth that the national income is now the index of the nation's well-being. And trite as it appears to be, a better and more practical consideration and evaluation of the three component parts—government, management, labor—seems essential if any permanent prosperity is to be attained. In a word, real and wholehearted cooperation is urgently needed.

A constructive step in this direction is found in the new platform adopted by the National Association of Manufacturers at its annual Congress of American Industry held in New York last week. The resolutions committee, formed of sixty-three industrial leaders, drafted a Program for American Progress which represents a compromise between the advocates of the old and the new concepts of industrial management, with the advocates for more and better cooperation in the minority. However, the platform for the ensuing year is likely to be productive of more practical value than that evolved last year. In 1937, the keynote appeared to be unshackle industry from government and labor, while this year the meeting closed with the generalized declaration that: "The removal of existing obstacles is a job for government, labor, agriculture, commerce and industry, requiring the best efforts of all."

In reference to labor relations the platform said in part: "Industry recognizes mutually satisfactory labor relationships as an essential to industrial efficiency and to the providing of more jobs and better living. Industrial management recognizes that employees who wish to bargain collectively are entitled to do so, in whatever form they determine, through their own freely chosen representatives, and without intimidation or restraint from any source. The disturbed labor relations which have existed during the past few years are a major obstacle to recovery. Industry pledges its full cooperation in whatever changes may be necessary to correct these conditions. . . . Constant improvement of methods of production creates jobs. Industrial management should endeavor to cushion the effects on individual employees of the introduction of new processes and labor-saving machinery; management and labor should cooperate in using every practicable means to provide continuity of employment, and should study the annual wages of employees in relation to their hourly earnings and the number of days per year the plant operates, including careful consideration of the effect of hourly rates upon continuity of employment and income."

Of government, the platform states in part; "Useful and necessary expenditures for government must always be provided for, but the time has come for a better understanding with respect to the portion of the total national production which can be diverted to governmental purposes without causing a loss of jobs and lowering living standards. We recognize the value of accurate accounting by industry and believe that the same standards should be pursued by government in preparing its own financial reports, thus enabling the citizen to understand the operations of his government. We advocate widespread adoption of the spirit as well as of the letter of the civil service system in the selection of government employees, as a means of promoting both efficiency and economy. . . . Manufacturers should never overlook the fundamental processes of the private enterprise system in constantly improving production, lowering costs and passing as much as practicable of these benefits to the public through lower prices. We believe it is equally important for government to improve the efficiency of its services and lower the cost of government to the public. This process in gov-

ernment, as well as in business, is vitally necessary to recovery." In regard to government competition the platform states: "Continuing and increasing government competition with private enterprise is a major deterrent to the flow of job-creating capital into business."

In regard to taxes, the platform states in part: "The mounting tax burden has meant that the self-supporting person has had to turn over an ever-larger portion of the proceeds of his labor to meet the expense of government. The cost of unemployment relief is a load on all employed persons who must divert part of their own income to support the unemployed. Each dollar paid by the people in taxes is a dollar withdrawn from their individual purchasing power. Taxes add to the cost of whatever is bought, reduce the volume of sales and production and lessen the incentive for capital to invest.

"We believe that the government itself should consider the advisability of lowering tax rates as a means of increasing tax receipts. The psychological and economic effects would be to give industry and its customers a "go ahead" signal, thus promoting industrial production and distribution and consequently raising government income. We recommend the creation of a non-partisan representative committee to study the whole tax problem and make suggestions for complete scientific revision, clarification and simplification of all forms of national, State and local taxes."

In ridiculing deficit financing, Paul Cadman, president of the American Research Foundation, said in part: "A large number of the American people have been drugged into believing that government can provide them with wealth and security. Nothing is farther from the truth. But, unless all signs fail, we are emerging from the era of wealth-by-wishing and are plotting the course of real recovery. It is chartered by experience and it is called solvency."

American Writing Gets Merit Certificate

[FROM OUR REGULAR CORRESPONDENT]

HOLYOKE, Mass., December 12, 1938—A certificate of Merit has been awarded the American Writing Paper Corporation by the Associated Industries of Massachusetts for its Eagle-A Leonardo, a new line of deckle edge text paper made in three weights and white and ivory. It was named for Leonardo da Vinci and its antique finish is reminiscent of Old World hand made papers.

Great Eastern Storehouse Burned

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., December 12, 1938—Fire destroyed 75,000 tons of waste paper and rags in the storehouse of the Great Eastern Packing & Paper Stock Corporation, 125-133 Halleck street, Roxbury, December 10, with the loss estimated at $50,000. The cause was undetermined.

Production Ratio Report

(These statistics are based upon paper production reports to the American Paper and Pulp Association).

COMPARATIVE MONTHLY SUMMARIES

Months	1938(c)	1937(c)	1936	1935	1934
January	63.9%	90.3%	76.1%	65.8%	.....
February	68.7%	90.1%	77.9%	70.0%	.....
March	69.6%	90.3%	76.0%	70.5%	.....
April	68.3%	92.1%	82.3%	70.0%	.....
May	69.0%	90.6%	81.6%	69.4%	.....
June	66.0%	87.3%	80.7%	72.3%	.....
July	72.0%	81.8%	77.3%	64.9%	.....
August	77.2%	82.9%	81.5%	70.9%	.....
September	76.3%	78.6%	80.5%	71.9%	58.2%
October	82.5%	73.5%	87.6%	75.6%	64.7%
November	79.7%	61.9%	88.0%	75.3%	61.7%
December	.....	54.5%	85.9%	71.2%	59.6%
Year Average	.....	80.6%	81.3%	70.5%	.....
First 48 weeks	72.1%	83.0%	81.1%	70.5%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS. 1938		CORRESPONDING WEEKS. 1937	
October 29	81.8%	October 30	68.8%
*November 5	82.6%	November 6	65.3%
*November 12	80.9%	November 13	61.7%
*November 19	81.9%	November 20	62.5%
*November 26	73.6%	November 27	58.0%
*December 3	78.8%	December 4	61.0%

The following statistics show the number of mills reporting by ratio groups:

	Number of Mills Reporting, Current Weeks					
Ratio Limits	Oct. 29, 1938	Nov. 5, 1938	Nov. 12, 1938	Nov. 19, 1938	Nov. 26, 1938	Dec. 3, 1938
0% to 50%	56	63	76	60	90	45
51% to 100%	252	243	230	238	186	159
Total Mills Reporting	308	306	306	298	276	204

* Subject to revision until all reports are received.
(c) Basic capacity data have been adjusted to correspond with ratings reported by individual companies.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours", were as follows:

Mos.	1938 (e)	1937 (e)	1936	1935	Mos.	1938 (e)	1937 (e)	1936	1935
Jan.	55%	80%	61%	61%	July	57%	67%	69%	59%
Feb.	61%	86%	67%	67%	Aug.	66%	74%	75%	65%
Mar.	60%	87%	68%	67%	Sept.	66%	70%	76%	69%
Apr.	57%	89%	70%	61%	Oct.	70%	66%	82%	76%
May	58%	86%	68%	61%	Nov.	....	56%	79%	70%
June	56%	75%	68%	65%	Dec.	....	46%	74%	60%

Week end. Oct. 29, 1938—69%
Week end. Nov. 5, 1938—68%
Week end. Nov. 12, 1938—66%
Week end. Nov. 19, 1938—67%
Week end. Nov. 26, 1938—57%
Week end. Dec. 3, 1938—61%

(e) Basic figures revised to include new members of the National Paperboard Assn.

RFC Authorizes Loans to Paper Firms

WASHINGTON, D. C., Dec. 14.—The Reconstruc-Finance Corporation in its monthly report shows the authorization of a loan to the Southland Paper Mills, Inc., Lufkin, Texas, amounting to $3,425,000.

A loan of $1,700,000 was also authorized by the corporation to the Fox River Paper Corporation, Appleton, Wisconsin; to the Apex Paper Box Corporation, Chicago, Ill., $25,000; to the Boston Envelope Company, Dedham, Mass., $125,000; and to the Famous Paper Box Company, New York City, $25,-000. The report of the corporation shows that up to the end of November no actual cash had been paid.

Kenroy Corp. Moves

The Kenroy Bag and Paper Corporation announces its removal from 474 to 364 West Broadway, New York City, where it will occupy larger and more desirable quarters.

PENCHLOR
● ASPLIT CEMENT

CUTS MAINTENANCE IN *Digesters* **AND** *Acid Towers . . .*

● Penchlor Asplit Cement* makes possible a far higher degree of durability in the masonry construction used by the pulp industry. It is immune to rapid temperature changes because of its low coefficient of thermal expansion. This, combined with its unusual strength and strong adherence to brick and tile, keeps joints tight and reduces spalling.

Its exceptional resistance to abrasion is a further advantage. Pulp and water washing its surface at high velocities scarcely effect it, even over a long period of time. Penchlor Asplit Cement is highly acid-proof, being immune to all acids normally used in the pulp and paper industry.

It has a smooth finish that does not catch and hold the pulp. It is non-porous. Liquid tight. It is self-hardening, with a setting time that is easily controlled by the temperature applied. We will gladly advise you on all questions of acid protection, and furnish detailed instructions for carrying out the work. Why not write us for full details?

PENNSYLVANIA SALT MANUFACTURING COMPANY · Est. 1850 · WIDENER BLDG., PHILADELPHIA, PA.
NEW YORK · CHICAGO · ST. LOUIS · PITTSBURGH · TACOMA · WYANDOTTE

* Penchlor Cements are fully protected by patents

PENNSYLVANIA SALT *Chemicals*

Section of the
Technical Association of the Pulp and Paper Industry

Edited by Ronald G. Macdonald, Secretary

A Survey of the American Literature in the Field of Cellulose and Related Subjects for 1933 Through 1937

By Harry F. Lewis [1]

(Concluded from the issue of December 8, 1938)

Permanence

An active interest in the permanence of paper has been manifested during the past few years. This has been due in large part to the development of purified wood pulps and their use in high grade papers, and in part to the attention called by the League of Nations to the condition of printed materials, manuscripts, and other valuable World War documents. Of general interest in this connection is an abstract by Whalley *(313)* of the report prepared by the League of Nations. Earlier work in various laboratories has rather definitely established the fact that, all other things being equal, the permanence of paper is related to the purity of the stock used in its manufacture. Such purity is indicated by alpha-cellulose and copper number determinations. The particular impurities in paper which are responsible for a loss of permanence on aging have not yet been definitely established. Torrey and Sutermeister *(314)* have analyzed very old papers. As a result of their work, the authors think it highly probable that the chemical characteristics of a paper as a whole, rather than those of the fibrous portions only, are responsible for its permanence or lack of permanence. They say that a high original alpha-cellulose content will not be necessary for paper which is to last for several centuries and the specifications which are based usually on this property are liable to be very misleading. Kantrowitz and Simmons *(315)* review the present knowledge of the factors influencing the endurance of paper. They make reference to chemical and physical tests, including accelerated aging tests and their reliability for forecasting the longevity of a given paper. Opinions of different investigators vary with regard to the value of such tests. The Committee on Permanence and Durability of the Technical Association of the Pulp and Paper Industry *(316)* has likewise prepared a review in criticizing recent investigations and questions the value of any accelerated aging tests. The members of the Committee *(317)* later suggest detailed plans for future tests which involve the preparation and storage of a variety of papers for periods of time up to 200 years. Farquhar *(318)* describes the experiment being carried out by the University of California Press in printing a special edition of 25 copies of their scientific work on a permanent 100 per cent rag paper of the type used by the United States Government Printing Office. These copies are distributed to a selected list of depositors throughout the world, in the hopes that the records will be intact a thousand years from now.

Extended exposure of paper for a 200-day period in circulating air maintained at 38° C. has been shown by Richter *(319)* to result in changes that correlate well with the corresponding changes taking place with the same types of paper, respectively, when they are subjected to the 72 hour 100° C. test. Fold is again shown to be more susceptible to the effect of aging than the other tests. Severe chemical oxidation of an unbeaten cellulose fiber is reflected in marked sacrifice in the stability of the paper produced from the pulp. Blaisdell and Minor *(320)* have utilized the accelerated aging tests at 100° C. in attempting to correlate purity and permanence in the lower grades of paper. They have used for this purpose a white facial tissue made of highly bleached sulphite and a cream colored toweling made of unbleached sulphite. They conclude that high purification of fiber does not necessarily imply high permanence, and that the original copper numbers of paper of this type give no clue to the permanence of the

(313) Whalley, M. E., *Paper Trade J.* 97, No. 3: 32-35 (July 20, 1933).
(314) Torrey, W. V., and Sutermeister, E., *Paper Trade J.* 96, No. 21: 45-46 (May 25, 1933).
(315) Kantrowitz, M. S., and Simmons, R. H., *Proc. Graphic Arts Conference*, 1936: 3-7.
(316) TAPPI, Committee on Permanence and Durability, *Paper Trade J.* 97, No. 4: 33-36 (July 27, 1933).
(317) TAPPI, Committee on Permanence and Durability, *Paper Trade J.* 105, No. 9: 92-94 (Aug. 26, 1937).
(318) Farquhar, S. T., *Paper Trade J.* 98, No. 11: 22 (March 15, 1934).
(319) Richter, G. A., *Ind. Eng. Chem.* 26, No. 11: 1154-57 (Nov., 1934).
(320) Blaisdell, C. A., and Minor, J. E., *Paper Ind.* 15, No. 9: 512-14 (Dec., 1933).

[1] Member TAPPI, Dean, The Institute of Paper Chemistry, Appleton, Wis.

paper. Incidentally, they also bring out that a marked change of copper number with oven or light aging may be considered as indicative of a marked loss of absorbent quality with normal aging and also that changes of absorbent quality with oven aging are due to drying out of moisture and a chemical degradation of the fibers. Two papers describing the relative permanence of papers exposed to sunlight have been written by Richter. The first *(321)* deals with the attempt to correlate physical degradation with chemical oxidation by the exposure of a large number of commercial and specially prepared papers to natural sunlight. Attempts were also made to protect papers from light spoilage by the addition of suitable chemicals. In the second article *(322)*, a continuation of the first, the loss of fold was again found to be much greater than the loss in tear, tensile, or pop. Special sizing agents are suggested for protection against degradation by sunlight.

Additional work on the factors which influence or increase stability of paper has been carried out at the National Bureau of Standards. Rasch, Shaw, and Bicking *(323)* describe experiments with a domestic and a foreign bleached sulphite made into a series of 43 bond papers on a semi-commercial scale. The results indicate that the stability of rosin-sized sulphite sheets, as measured by the accelerated aging tests of the Bureau of Standards, is not closely related to the amount of rosin present. Improvement in stability results from a careful control of the acidity of rosin-sized papers. Optimum stability results when the alum in the tub-size is kept at a minimum. Rasch and Scribner *(324)* have compared the natural aging of 33 papers ranging in fiber composition from 100 per cent rag to 100 per cent sulphite and book papers prepared from mixtures of sulphite and soda, with the accelerated aging test on these same papers. They find that the chemical properties of the papers showed little change in four years of natural aging, but the folding endurance of the papers underwent marked changes, several decreasing to less than half of the initial value. The papers were placed in approximately the same order of stability by normal aging as they were by the accelerated aging tests conducted four years previously. The authors believe that this constitutes additional evidence of the validity of the heat test as a means of estimating the relative aging qualities of the paper.

Jarrell, Veitch, and Hankins *(325)* have examined 38 samples of paper taken from old books, magazines, and court records ranging in age from 19 to 169 years. Chemical and physical tests were made on margins and center sections. More acid and water-soluble sulphates were in general found in the margin than in the center section of the same leaf because of the absorption of acid sulphur compounds from the air. As a rule, the fold and pop of the center parts were equal to or greater than the margins. Papers with the highest acidity undergo the most rapid deterioration in storage. Life of the paper is prolonged by the introduction of basic fillers, etc., which serve to neutralize or counteract gaseous sulphur compounds.

(321) Richter, G. A., *Ind. Eng. Chem.* 27, No. 2: 177-85 (Feb., 1935).
(322) Richter, G. A., *Ind. Eng. Chem.* 27, No. 4: 432-39 (April, 1935).
(323) Rasch, R. H., Shaw, M. B., and Bicking, G. W., *Bur. Standards J. Research* 11, No. 1: 7-23 (July, 1933).
(324) Rasch, R. H., and Scribner, B. W., *Bur. Standards J. Research* 11, No. 6: 727-32 (December, 1933).
(325) Jarrell, T. D., Veitch, T. P., and Hankins, J. M., *U. S. Dept. Agr., Tech. Bull.* 541. 20 p. (1936).

Shaw, Bicking, and O'Leary *(326)* have carried on an investigation of the relation of some properties of cotton rags to the strength and stability of experimental papers made from them. High grade bond papers were made from new and old cotton rags. Unsized, engine sized, and surface sized papers were included. Rosin size was used for most of the beater sizing, it being precipitated on the fibers in the usual way with alum. The basic rags, the half stuff made from them, and the finished papers were analyzed. The results demonstrate that stable paper can be made from new rags. The data also confirm the general belief that high acidity resulting from excessive use of alum in rosin sizing has a marked deteriorating effect upon paper. The *p*H value for optimum results as far as stability is concerned was approximately 5.0. The study shows that careful processing of raw materials in respect to active chemical components, such as alum, rosin, etc., is necessary for the manufacture of stable papers. A study of the effect of fiber components on the stability of book papers has been made by Shaw and O'Leary *(327)*. They used four kinds of purified wood pulp, a beater mixture of soda and sulphite, new rags and old rags. The papers made from the rag stocks had the characteristics of good book paper and a very high degree of permanence. The papers made from the purified wood pulps were found in two cases to be strong and relatively stable. The soda-sulphite sheet was much less stable. A close relation was found between the cellulose purity of the fibers and the stability of the unsized papers. Lewis has continued with his investigation of the relative stability of bleached rag half stock and bleached purified sulphite pulp. He describes *(328)* the chemical stabilities of the above material toward degradation by strong calcium hydrochloride solution. The results showed decreases in cuprammonium viscosity and alpha-cellulose, and increases of beta- and gamma-cellulose and of copper number. The results confirm the earlier conclusions that, the purer the half stock in terms of alpha-cellulose and copper number, the more resistant it is to chemical degradation.

A number of articles have appeared dealing with the preservation of records. Scribner *(329)* has made an examination of newspapers published in the United States from 1830 to 1900 and has described their condition at the present time. The papers made prior to 1868 were composed entirely of rag, and mixtures of this fiber with other chemically treated fibers from straw were found in some papers dated prior to 1800. Nearly all of these papers were in good condition. Most of the newspapers published after 1868 contain crude groundwood fibers, and these have deteriorated considerably. Tests of special issues of newspapers printed since 1927 on high grade paper for permanent library files indicate that some records will be preserved in this way. For retarding decay of newspapers, he recommends the use of Japanese tissue paper or transparent cellulose acetate sheeting. He also discusses the reproduction by photostat and photolith processes on high grade paper, the printing of the negative on glass plates in miniature and the reproduction of print on film

(326) Shaw, M. B., Bicking, G. W., and O'Leary, M. J., *J. Research Natl. Bur. Standards* 14, No. 6: 649-65 (June, 1935).
(327) Shaw, M. B., and O'Leary, M. J., *J. Research Natl. Bur. Standards* 17, No. 6: 859-69 (December, 1936).
(328) Lewis, H. F., *Paper Trade J.* 96, No. 19: 41-46 (May 11, 1933).
(329) Scribner, B. W., *Paper Trade J.* 99, No. 14: 31-35 (Oct. 4, 1934).

slides. Kuhlman *(330)* has embodied in an article the opinions of librarians and others well qualified to discuss whether it is now time to preserve newspapers on films. The author expressed the hope that, within a year, an authoritative statement will be issued from the Bureau of Standards on such questions as the physical and chemical properties of cellulose acetate film, the processing of the film for obtaining the most durable products, and the effect of storage conditions and use conditions on its permanence. This has been done by Hill and Weber *(331)*. Using an accelerated aging test, they find cellulose acetate film to have a stability of the same order as permanent record paper film.

Kimberly and Emley *(332)* find that paper in books stored in urban institutions has a higher acidity and copper number and a lower alpha-cellulose content and folding endurance than identical volumes kept in country libraries. They believe this greater deterioration is due to the sulphur dioxide in the atmosphere arising from combustion of fuel. In another paper, Kimberly *(333)* has gone into the matter of the preservation of records and vital statistics. In this he discusses the influence of paper, inks, bindings, and storage conditions on the life of written records. Zimmerman, Weber, and Kimberly *(334)* have studied the comparative resistance of inked and uninked specimens to the effect of accelerating aging tests. They found that the time of deterioration of writing paper was increased by the common type writing ink. The effect on papers suitable for permanent records, which deteriorated very little when uninked, was more apparent than on papers of lower grade. Iron-gallotannate, prepared according to the government formula for standard writing ink, was found to greatly accelerate the deterioration of papers in the heat test. An ink made with ammonium-ammoniumoxyferrigallate was found to have a minimum of deleterious effect. Weber, Shaw, and Beck *(335)* found that the chemicals used in the fumigation of buildings for the removal of destructive insects have no harmful effect on any of the papers studied. It appears that these chemicals can be safely used for killing insect life in records of permanent value.

Chemical Testing

A large number of reports dealing with official methods and tentative standards for the analysis and testing of raw materials and finished products have been set up by the Technical Association of the Pulp and Paper Industry since 1933. Inasmuch as these reports do not represent actual research or development, they have not been included in their survey. The actual investigations dealing with these various subjects have been included where they are available and have been carried out in the United States.

Among these studies is one by Browning and Ulm *(336)* dealing with acidity in paper. The authors consider particularly the nature of the acidity of paper with regard to hydrolysis and acid formation during the water extraction, also the effect of metallic ions, and the nature of the extracted material, using potentiometric titration methods.

Lewis and Browning *(337)* have carried out a critical study of some of the factors which influence the determination of alpha-cellulose. Such an investigation seemed worthwhile in view of the fact that in the United States there are three methods generally employed. The influences of differences in procedure and other factors of importance have been studied and the effect of such differences is discussed. A slight modification of the method recommended by the Cellulose Division of the American Chemical Society and by the Pulp Testing Committee of TAPPI was outlined as the basis for further study. Bump *(338)* has presented an article in which the effect of concentration of alkali and time of treatment in the alpha-cellulose determinations are briefly described. The author proposes to modify the American Chemical Society method so as to eliminate the exact specifications for time of treatment and sample-reagent ratio. This he would do by treating three different samples for times in excess of ten minutes, plotting the values and drawing a line through these values to zero time, which, according to him, would represent the actual alpha-cellulose content of the sample. Reid and Lynch *(338a)* have compared the Cross and Bevan, Norman and Jenkins and the Kürschner and Hoffer methods for the determination of cellulose in a variety of fibrous materials. Based on the weights of ash-free cellulose found, the Cross and Bevan and Norman-Jenkins results were shown to be practically the same but the Kürschner-Hoffer yields were 10 to 15 per cent lower. However, the Kürschner-Hoffer cellulose was considerably lower in pentosans and lignin and the calculated "pure cellulose" only averaged about 4 per cent lower than the Cross and Bevan "pure cellulose" and about equal to the Norman-Jenkins "pure cellulose." The Kürschner-Hoffer method was found to be approximately twice as fast as either of the other methods, and is recommended for large numbers of routine cellulose analyses, particularly on agricultural wastes where no further determinations on the resultant cellulose is contemplated. Launer *(339)* has described a relatively rapid and simple method for the determination of alpha-, beta-, and gamma-cellulose, using 0.3 gram. The method is a volumetric one involving oxidation by potassium dichromate solution, the strength of which need not be known accurately as the concentrations of the oxidimetric solutions do not enter into the calculation. The volumetric results are said to be in good agreement with those by the gravimetric method and are reproducible for widely different materials. Launer *(340)* has also developed a simplified method for the determination of resin in papers and pulps, which involves first the extraction with 95 per cent ethyl alcohol acidified with hydrochloric acid and the solution of the extract in the anhydrous ether. The method is applicable also to the determination of natural resins in wood pulp. The equivalent weight of the extracted resin, based on the oxidation by bichromate, is made the basis for the criterion of purity of the

(330) Kuhlman, A. F., *Library Quarterly* 5, No. 2: 189-214 (April, 1935).
(331) Hill, J. R., and Weber, C. G., *J. Soc. Motion Picture Engrs.* 27, No. 6: 677-90 (Dec., 1936).
(332) Kimberly, A. E., and Emley, A. L., *Natl. Bur. Standards, Misc. Pub.* No. 140. 7 p. (1933).
(333) Kimberly, A. E., *U. S. Bur. of the Census, Vital Statistics, Special Reports* 3, No. 33: 153-60 (Aug. 5, 1937).
(334) Zimmerman, E. W., Weber, C. G., and Kimberly, A. E., *J. Research Natl. Bur. Standards* 14, No. 4: 463-68 (April, 1935).
(335) Weber, C. G., Shaw, M. B., and Beck, E. A., *J. Research Natl. Bur. Standards* 15, No. 3: 271-75 (Sept., 1935).
(336) Browning, B. L., and Ulm, R. W. K., *Paper Trade J.* 102, No. 8: 69-70, 72, 74, 76, 78, 80, 82, 84, 86 (Feb. 20, 1936).
(337) Lewis, H. F., and Browning, B. L., *Paper Trade J.* 97, No. 24: 39-44 (Dec. 14, 1933).
(338) Bump, C. K., *Ind. Eng. Chem., Anal. Ed.* 6, No. 3: 223-25 (May 15, 1934).
(338a) Reid, J. D., and Lynch, D. F. J., *Ind. Eng. Chem., Anal. Ed.* 9, no. 12: 570-3 (Dec., 1937).
(339) Launer, H. F., *J. Research Natl. Bur. Standards* 18, No. 3: 333-42 (March, 1937); 20, No. 1: 87-95 (Jan., 1938).
(340) Launer, H. F., *J. Research Natl. Bur. Standards* 18, No. 2: 227-34 (February, 1937).

extract. Phillips and Goss *(341)* describe a method for the determination of the percentages of methoxyl and ethoxyl when both of these groups are present in the same compound or in mixtures of various compounds. Barber and Minor *(342)* recommend the use of one-half per cent solutions for the determination of cuprammonium viscosities of stock having high viscosity and one per cent solutions for the stocks of lower viscosity.

The analysis of paper ash containing titanium pigments has been described by Jarmus and Willets *(343)*. The usual analysis of paper ash is modified to provide for the presence of pure titanium dioxide, titanium dioxide-barium sulphate composite (Titanox B) and titanium dioxide-calcium sulphate composite (Titanox C).

A proposed method has been published *(344)* for evaluating quantitatively the resistance of paper to alkali staining which involves matching the color of the alkali-treated paper against standards made with dichromate Congo red solutions. Crossley *(345)* describes a similar test for use with soap-wrap paper.

Fiber Identification

Shaffer *(346)* recommends a stain prepared by dissolving sodium carbonate in distilled water and adding brazilin. He states that bleached sulphite is stained a wine red color and bleached sulphate is stained a purple color by this solution. Kantrowitz and Simmons *(347)* have compared the official TAPPI or Bright method, the Filz method, and the Government Printing Office method, which is a modification of the Bright stain, for differentiating bleached and unbleached fibers in pulp and paper. They recommend that the Government Printing Office method be considered by TAPPI as an official method. Graff in a series of three papers has outlined in detail new stains for use in fiber identification. In two of these *(348, 349)* the range of application of these stains is described. It is shown that certain stains can be used for determining the cooking degree or bleachability and uniformity of cooking, as well as the bleaching and refining degree of a given pulp. In a third paper *(350)* he takes up in detail a standard method for the preparation of slides, a uniform count method, the accuracy to be expected from a single analysis, and the uniformity of a fiber furnish across the machine direction of a sheet of paper. A fiber symposium was held at The Institute of Paper Chemistry June 9 to June 17, 1936, in which the members of the Fiber Testing Committee of the Technical Association of the Pulp and Paper Industry met with other members of the Association for the purpose of recommending to the Association stains to be used for fiber identification. A report of this symposium has been published *(351)*. Based on the results of this symposium, committee recommendations for standard fiber methods have been presented to the Technical Association. Lee *(352)* has determined the shade resulting in various fibers from treatment with a solution containing calcium chloride and potassium iodide saturated with iodine.

Dyes and Dyeing

Inasmuch as this review covers fundamental investigations of cellulose and related products and the applications of these fundamental studies, principally to the problems of the paper industry, no attempt has been made in this section of the review to cover the problem of dyeing textile fibers, which in itself is a very large field. Among the papers of fundamental interest is one by Clark and Southard *(353)* dealing with the sorption on cotton fibers of dyes with varying molecular association in solution. This is of value, not only from a practical standpoint in commercial dyeing, but also because of the possible light that may be thrown on the fine structure of a given fiber, since the sorption of dyes on any fiber depends on the porosity and size of the capillary pores in the fiber, as well as on the basic or acidic nature of the dye and the polarity of the surface of the fiber. Rose *(354, 355)* discusses the dyeing of cellulose materials with reference to the structure of cellulose itself. In brief, he says that materials composed of cellulose differ markedly in their behavior during the dyeing process. Even mercerization changes the dye index of the fiber distinctly and the change becomes still more marked when the cellulose is regenerated, as for rayon. Dyestuffs which have the greatest affinity for cotton show poor affinity for rayon. Paper will dye differently according to the extent to which the fibers are broken down during beating. The material in all these cases is essentially similar chemically but dissimilar in structure. An effort is made in this paper to describe the essentials of the dyeing process sufficiently to make clear why the different behavior of the different dyes constitutes a real contribution to our knowledge of the constitution of cellulosic materials. Farr *(356)* suggests a new experimental approach to many of the problems involved in the reactions of fibers to dyes, based on her theory of cellulose structure.

Among the various practical problems related to the dyeing of paper is that of retention of dyes on papermaking fibers under various conditions. Harrison *(357)* has developed a spectrophotometric method for determining dye retention, using Beer's law as its fundamental principle. By the use of this method, dye retentions for 20 dyes were determined on the more common pulps under varying conditions of concentration, consistency, temperature, time, and freeness. In addition, a spectrophotometric method for determining dye retentions was developed, based upon the use of the Kubelka and Munk equation. The results obtained were found to agree, thereby establishing the validity and applicability of the equation. The Freundlich adsorption equation was found to represent the retention data. The calculation of the spectral reflectivity of dyed handsheets has been developed by Nolan *(358)*. Rose and Schmidt *(359)*

(341) Phillips, M., and Goss, M. J., *J. Assoc. Official Agr. Chem.* 20, 292-97 (May, 1937).
(342) Barber, F., and Minor, J. E., *Paper Ind.* 19, No. 1: 60-62 (April, 1937).
(343) Jarmus, J. M., and Willets, W. R., *Paper Trade J.* 98, No. 1: 41-43 (Jan. 4, 1934).
(344) *Paper Trade J.* 104, No. 19: 50 (May 13, 1937).
(345) Crossley, T. L., *Paper Trade J.* 105, No. 6: 85-86 (Aug. 5, 1937).
(346) Shaffer, R. W., *Ind. Eng. Chem., Anal. Ed.* 5, No. 1: 35-36 (Jan., 1933).
(347) Kantrowitz, M. S., and Simmons, R. H., *Paper Trade J.* 98, No. 10: 46-48 (March 8, 1934).
(348) Graff, J. H., *Paper Trade J.* 99, No. 1: 31-33 (July 3, 1934).
(349) Graff, J. H., *Paper Trade J.* 100, No. 16: 45-50 (April 18, 1935).
(350) Graff, J. H., *Paper Trade J.* 101, No. 2: 36-50 (July 11, 1935).
(351) *Paper Trade J.* 105, No. 15: 28-37 (Oct. 7, 1937).
(352) Lee, H. N., *Tech. Studies Field Fine Art* 4, 93-106 (1935).
(353) Clark, G. L., and Southard, J., *Physics* 5, No. 3: 95-100 (March, 1934).
(354) Rose, R. E., *Ind. Eng. Chem.* 25, No. 11: 1265-68 (Nov., 1933).
(355) Rose, R. E., *Rayon and Melliand Textile Monthly* 15, No. 4: 174-76; 15, No. 5: 247-49 (April, May, 1934).
(356) Farr, W. K., *Am. Dyestuff Reptr.* 26, No. 6: 143-54 (March 22, 1937).
(357) Harrison, W. D., *Paper Trade J.* 105, No. 13: 39-45 (Sept. 23, 1937).
(358) Nolan, P., *Paper Trade J.* 105, No. 14: 42-45 (Sept. 30, 1937).
(359) Rose, R. E., and Schmidt, J. C., *Paper Trade J.* 101, No. 5: 37-39 (Aug. 1, 1935).

have analyzed the mechanism of the dyeing of paper and present facts to show that paper coloring is more akin to lake making than to textile dyeing. Use is made of the information which has accumulated regarding the mechanics of the dyeing processes of textiles and rayon in explaining the coloring of paper.

The effect of *p*H upon the dyeing of paper making fibers and coloring of fillers has been taken up by a number of authorities. Friedman and Kuykendall *(360)* have studied the adsorption of acid and basic dyes upon alumina, cellulose, and paper fillers. These studies demonstrate the important part played by the freshly precipitated alumina and the necessity for careful control of the *p*H. The process of dyeing cellulose, kaolin, and talc is true absorption, since it follows the Freundlich law. Roberts *(361)* likewise stresses the importance of *p*H control in connection with dyestuffs and shows that much color is lost in off-shade paper made through the use of improper amounts of alum. Chalon *(362)* states that the *p*H optima of dyestuffs with a few exceptions are of purely theoretical but of no practical value. The *p*H optima as related to sizing, filler retention, strength, etc., are of far greater importance and should not be sacrificed to conform with the optimum *p*H of a dyestuff. Ekholm *(363)* and Laughlin *(364)* discuss the dyes to be used in coloring paper. The former article describes direct coal tar dyes, sulphur colors, and carbanthrene vat dyes which are suitable for use for paper dyeing. Laughlin gives quick, simple, and fairly reliable methods for determining the dyestuffs or types in a paper. Other general papers include one by Ekholm *(365)* on two-sidedness and two by Roberts *(366, 367)* on fastness to light, acid, alkali and chlorine, and two-sidedness, and on color problems in fillers.

Rayon

A large number of fundamental articles on the chemistry of the regenerated or modified celluloses have been discussed throughout this review. Aside from these, there have been published during the past few years a number of articles of general or specific interest to the rayon industry.

Such papers have been assembled in this section. General articles on the industry include one by an anonymous author *(368)*; a description of the development of the rayon industry in the United States by Esselen *(369)*; and a historical review and economic survey by Benger *(370)*. Venable *(371)* reviews recent developments in the cuprammonium, acetate, and viscose processes, with special emphasis on novel yarns and staple rayon.

Mease and Jessup *(372)* outline a quantitative method for the determination of cellulose-acetate rayon, silk, regenerated cellulosic rayon, cotton, and wool in mixtures.

Several articles have appeared describing the various steps or products in the production of viscose. Moore *(373)* describes the removal of the sulphur precipitated on the thread in the production of rayon. This essential step in producing a lustrous thread is carried out generally through the use of dilute solutions of sodium sulphide or free caustic containing glucose. The same author *(374)* outlines the physical and chemical changes involved in steeping and aging. Scherer *(375)* has determined the nature of the sulphur forms in crude viscose rayon yarn; a part is easily water-soluble but the residue, which is more difficult to remove, is assumed to be in the form of some sulphide combination with cellulose. In a later paper *(376)* he discusses the rate at which sulphur is removed from undesulpherized rayon by a number of different agents. Sulphur removal increases the tensile strength and elasticity.

Several articles have been written dealing with the subject of the specifications and uses of wood pulp for rayon. Three such articles are the following, all published anonymously: The first *(377)* discusses wood pulp as a raw material and reference is made to relation between the tests of the pulp and the nature of the finished product. A second article *(378)* calls attention to the need of additional pulp for rayon purposes, while the third *(379)* raises the question as to whether wood pulp can entirely replace cotton. Hansen *(380)* describes the manufacture of rayon from wood pulp by the viscose process. Brannock, Buriger, and Doud *(381)* and Rasch *(382)* present evidence to show that a good grade of rayon can be made from Southern pine. Hatch *(383)* tells of the advances made in the manufacture of wood cellulose of high purity and its expanding use for rayon, cellophane, and plastics. McIndoe *(384)* writes on the economic feasibility of a rayon plant in the Pacific Northwest. Goldsmith *(385)* discusses the superiority of highly purified wood pulps for rayon. Moore *(386)* outlines the different operations in preparing spruce sulphite for rayon manufacture, emphasizing particularly the most important points to be considered. Richter *(387)* refers to hard wood sulphite pulps which have been developed by the Brown Company for rayon manufacture and mentions the particular advantages of the product for rayon.

Paper and Paper Treatments

The use of rubber latex in the paper industry has received some attention. Melker *(388)* and Edwards *(389)* review the developments and indicate the characteristics imparted by latex. Townsend *(390)* describes the three basic processes according to which rubber may be incorporated with paper fiber *(a)* during beating, *(b)* during sheet formation, and *(c)*

(360) Friedman, L., and Kuykendall, D. V., Jr., *Paper Trade J.* 99, No. 12: 103-05 (Sept. 20, 1934).
(361) Roberts, J. R., *Paper Ind.* 15, No. 6: 313-15 (Sept., 1933).
(362) Chalon, O. T., *Paper Trade J.* 104, No. 1: 26 (Jan. 7, 1937).
(363) Ekholm, I., *Dyestuffs* 34, No. 2: 33-39; No. 3: 88-94; No. 4: 112-17, 120-21; No. 5: 144-45 (June, Oct., 1935; Jan., March, 1936).
(364) Laughlin, E. R., *Paper Ind.* 19, No. 7: 771-76 (Oct., 1937).
(365) Ekholm, I., *Paper Mill* 57, No. 17: 13 (April 28, 1934).
(366) Roberts, J. R., *Paper Mill* 57, No. 4: 4, 10 (Jan. 27, 1934).
(367) Roberts, J. R., *Paper Mill* 56, No. 43: 9-10 (Oct. 28, 1933).
(368) *Chem. Met. Eng.* 40, No. 8: 421 (May, 1933).
(369) Esselen, G. J., *Ind. Eng. Chem.* 27, No. 6: 642-47 (June, 1935).
(370) Benger, E. B., *Ind. Eng. Chem.* 28, No. 5: 511-16 (May, 1936).
(371) Venable, C. S., *Am. Dyestuff Reptr.* 26, No. 1: 6-8 (Jan. 14, 1937).
(372) Mease, R. T., and Jessup, D. A., *J. Research Natl. Bur. Standards* 15, No. 2: 189-98 (August, 1935).
(373) Moore, C. L., *Silk and Rayon* 7, No. 11: 498-501 (Nov., 1933).
(374) Moore, C. L., *Silk and Rayon* 8, No. 10: 454-55, 465-66 (Oct., 1934).
(375) Scherer, P. C., *Ind. Eng. Chem.* 25, No. 12: 1319-21 (Dec., 1933).
(376) Scherer, P. C., *Rayon Textile Monthly* 18: 33 (1937).
(377) *Silk and Rayon* 8, No. 8: 352-53, 374 (Aug., 1934).
(378) *Pac. Pulp Paper Ind.* 11, No. 5: 68, 70 (May, 1937).
(379) *Rayon Textile Monthly* 18, No. 9: 593-94 (Sept., 1937).
(380) Hansen, R. B., *Pac. Pulp Paper Ind.* 7, No. 4: 10-11 (April, 1933).
(381) Brannock, D. Y., Buriger, H., and Doud, E., *Chem. Met. Eng.* 42, No. 9: 486 (Sept., 1935).
(382) Rasch, R. H., *Paper Ind.* 17, No. 12: 948-53 (March, 1936).
(383) Hatch, R. S., *Paper Trade J.* 105, No. 4: 40-42 (July 22, 1937).
(384) McIndoe, W. C., *Pac. Pulp Paper Ind.* 11, No. 4: 5-7 (April, 1937).
(385) Goldsmith, C. H., *Rayon Melliand Textile Monthly* 16, No. 5: 513-14 (Sept., 1935).
(386) Moore, C. L., *Rayon Textile Monthly* 18, No. 9: 590-92; No. 10: 694-97 (Sept., Oct., 1937).
(387) Richter, G. A., *Rayon Textile Monthly* 18, No. 10: 679-80 (Oct., 1937).
(388) Melker, A. R., *Paper Trade J.* 96, No. 15: 23 (April 15, 1933).
(389) Edwards, J., *Paper Trade J.* 97, No. 26: 16-17 (Dec. 28, 1933).
(390) Townsend, H. B., *Paper Mill* 57, No. 50: 5-6 (Dec. 15, 1934).

after sheet formation. A later paper by Fine *(391)* tells of the progress of latex in the paper industry. A method for the preparation of latex-casein size for use in coated paper manufacture is described in detail. The use of latex in coated papers is also outlined by Birchard *(392)* The addition of 5 per cent rubber in the coating improves greatly the double fold and permits creasing without cracking the sheet. It is also said to decrease dimensional changes with variations in humidity.

The analysis of typical coated papers is discussed by Sutermeister *(393)*. McCarron and Rowland *(394)* have determined the influence of particle size distribution in clays on handsheet and coating characteristics. Two general papers on the nature and physical characteristics of clays are those of Insley and Ewell *(395)* on the thermal behavior of kaolin minerals and of Meyer *(396)* on the nature of china clays. Meyer's paper is more or less an excerpt of Research Paper 706 of the Bureau of Standards. The use of by-product calcium carbonate from kraft mills as a coating material is considered by Redd *(397)*. The author states that the material is being used in increasing quantities. The difficulties in lithographing on coated paper are listed by Reed *(398)*. They include (1) picking and peeling of the surface, (2) setting-off of the printed impression, (3) curling of papers coated on one side, and (4) scumming of the plates with "wearing-away" of the work.

The application of nitrocellulose to paper has been studied by Hollabaugh *(399)* and by an anonymous writer *(400)*. It is said that these coatings are sufficiently flexible to bend with the paper—at the same time a hard, non-tacky and glossy surface results. Smith *(401)* lists the advantage of using emulsified lacquers in coating papers, while Bowlby *(402)* gives a general summary of the process of applying lacquer to paper.

One of the interesting developments of the past few years has been the spread of the use of high-opacity pigments in paper. The two types receiving the greatest attention in the literature have been the zinc and titanium pigments.

The use of zinc pigments was first described in detail by Kress and Cyr *(403)* and the properties of the pigmented sheets by Cyr *(404)*. Other papers of general interest in regard to the use of zinc pigments are those of Belcher *(405)*, Cyr *(406)*, Steele *(407)*, and Vaughan *(408)*. Smith *(409)* shows that zinc pigments slow up the rate of growth of organisms, as compared with clay and titanium dioxide, causing slime and discoloration of pulp stock. A routine method for estimating zinc sulphide in paper is given by Steele *(410)*. A general paper on the retention of pigments in paper has been presented by Haslam and Steele *(411)*.

A large number of papers have appeared on the subject of titanium pigments for use in paper. Willets *(412)* discusses the introduction of such pigments and *(413)* describes their opacifying power. Many other papers have been written by Willets as the subject has been extended *(414-421)*. Hope, Moran, and Ploetz *(422)* have developed a rapid method for the determination of titanium, which involves the use of liquid zinc amalgam as a reducing agent, with subsequent titration with ferric ammonium sulphate.

Sutermeister *(423)* has studied satin white and concludes that its formula is best represented as:

$$3CaO.Al_2O_3.3CaSO_4.31H_2O$$

Many general papers have appeared on the subject of deinking. Wells *(424, 425)* describes a new printing ink, the iron lake of haematein, which is used for printing on groundwood paper for telephone directories. The removal of this ink involves the use of sulphur dioxide as a reducing agent. A method for deinking paper based on the use of sodium silicate and fatty acid is outlined by Snyder and MacLaren *(426)*. Hines and Bean *(427)* outline the necessary technical control for deinking operations.

The colloid chemistry of paper making has been considered in detail by Rowland *(428)*. The interdependence of paper making materials is shown. Liberation of free rosin is greater in the presence of pulps because of hydrolytic selective fixation of alkali by the pulps. Alum converts unhydrolyzed rosin soap to aluminum resinate; hydrous alumina and sodium sulphate are formed. Retention of free rosin and other materials is influenced by the presence of colloidal alumina; the presence of the sulphate ion decreases the flocculating power of alumina. Basic aluminum resinate and β-aluminum oxide formed during drying increase the sheet stiffness and ink receptivity.

Stamm *(429)* and Baker *(430-433)* consider the advantages to be gained by the use of white water in various mills and on different types of machines. Chase *(434)* states that the acidity in paper may be

(391) Fine, R. F., *Paper Ind.* 17, No. 11: 801-03 (Feb., 1936).
(392) Birchard, W. H., *Paper Ind.* 15, No. 10: 561-63 (Jan., 1934).
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(394) McCarron, R. D., and Rowland, B. W., *Paper Trade J.* 96, No. 22: 36-39 (June 1, 1933).
(395) Insley, H., and Ewell, R. H., *J. Research Natl. Bur. Standards* 14, No. 5: 615-27 (May, 1935).
(396) Meyer, W. M., *Paper Trade J.* 105, No. 11: 35-36 (September 9, 1937).
(397) Redd, O. F., *Paper Ind.* 5, 559-61 (August, 1937).
(398) Reed, R. F., *Paper Trade J.* 102, No. 22: 37-39 (May 28, 1936).
(399) Hollabaugh, C. B., *Paper Trade J.* 101, No. 25: 39-45 (Dec. 19, 1935).
(400) *Paper Maker (U. S.)* 4, No. 4 (1935).
(401) Smith, L. J., *Paper Trade J.* 104, No. 25: 22 (June 24, 1937).
(402) Bowlby, W. D., *Paper Trade J.* 105, No. 7: 43-44 (August 12, 1937).
(403) Kress, O., and Cyr, H. M., *Paper Trade J.* 96, No. 10: 35-38 (March 9, 1933).
(404) Cyr, H. M., *Paper Trade J.* 96, No. 24: 31-33 (June 15, 1933).
(405) Belcher, V. A., *Paper Trade J.* 98, No. 11: 37-39 (March 15, 1934).
(406) Cyr, H. M., *Paper Ind.* 16, No. 4: 257 (July, 1934).
(407) Steele, F. A., *Paper Trade J.* 99, No. 12: 105-6 (September 20, 1934).
(408) Vaughan, E. K., *Am. Paper Merchant* 30, No. 11: 16-17 (Nov., 1935).
(409) Smith, O. A., *Paper Trade J.* 99, No. 19: 41-42 (Nov. 8, 1934).
(410) Steele, F. A., *Paper Trade J.* 97, No. 9: 27-28 (Aug. 31, 1933).
(411) Haslam, J. H., and Steele, F. A., *Paper Trade J.* 102, No. 2: 36-39 (Jan. 9, 1936).
(412) Willets, W. R., *Paper Trade J.* 97, No. 10: 28, 30 (Sept. 7, 1933).
(413) Willets, W. R., *Paper Trade J.* 97, No. 12: 35-38 (Sept. 21, 1933).
(414) Willets, W. R., *Paper Trade J.* 98, No. 6: 37-39 (Feb. 8, 1934).
(415) Willets, W. R., *Paper Trade J.* 100, No. 1: 26-27 (Jan. 3, 1935).
(416) Willets, W. R., *Paper Trade J.* 101, No. 13: 81-86 (Sept. 26, 1935).
(417) Willets, W. R., *Paper Trade J.* 102, No. 3: 36-39 (Jan. 16, 1936).
(418) Willets, W. R., *Paper Trade J.* 102, No. 19: 33-35 (May 7, 1936).
(419) Willets, W. R., *Paper Trade J.* 103, No. 21: 43-45 (Nov. 19, 1936).
(420) Willets, W. R., *Paper Ind.* 16, No. 4: 256 (July, 1934).
(421) Willets, W. R., *Paper Mill* 58, No. 45: 15-18 (Nov. 9, 1935).
(422) Hope, H. B., Moran, R. G., and Ploetz, A. O., *Ind. Eng. Chem., Anal. Ed.* 8, No. 1: 48-49 (Jan., 1936).
(423) Sutermeister, E., *Paper Ind.* 15, No. 12: 696-98 (March, 1934).
(424) Wells, S. D., *Chem. Met. Eng.* 40, No. 12: 634-37 (Dec., 1933).
(425) Wells, S. D., *Paper Trade J.* 98, No. 10: 41-43 (March 8, 1934).
(426) Snyder, T. H., and MacLaren, S. F. M., *Paper Trade J.* 98, No. 17: 46-47 (April 26, 1934).
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(428) Rowland, B. W., *J. Phys. Chem.* 41, No. 7: 997-1005 (Oct., 1937).
(429) Stamm, F. C., *Paper Trade J.* 98, No. 15: 39-40 (April 12, 1934).
(430) Baker, C. M., *Paper Trade J.* 96, No. 13: 31-34 (March 30, 1933).
(431) Baker, C. M., *Paper Trade J.* 101, No. 13: 95-98 (Sept. 26, 1935).
(432) Baker, C. M., *Paper Mill* 57, No. 3: 4, 17 (January 20, 1934).
(433) Baker, C. M., *Paper Mill* 58, No. 43: 43, 74 (October 26, 1935).
(434) Chase, G. C., *Paper Trade J.* 98, No. 22: 42 (May 31, 1934).

measured by determining the hydrogen-ion concentration of the tray water. Minor and Blaisdell *(435)* criticize the paper and present data which indicate that there is no direct relation between *p*H of white water and that of a distilled water extract of the finished sheet. Bechtel *(436)* has studied the recovery of fibers and fillers from white waters by chemical control. As an illustration, it was found from *p*H measurements that the adjustment of the *p*H with alkaline solutions would reduce the content of supernatant liquor after a half hour sedimentation from 5.39 pounds to 0.76 pound per 1000 gallons.

Cellulose Membranes and Fibers

The structure of cellulose fibers and their component parts has been the subject of a very considerable amount of research during the past five years, and at the present time certain phases of the question are matters of discussion. Any attempt to evaluate completely and in the proper order work of the various investigators would carry this review far into detail and beyond the space available for such a small section of the total subject. An attempt will be made, nevertheless, to outline the principal points at issue and to list the various publications in the field. It should be noted that these range through a wide variety of journals and without doubt references important to the subject at hand may have been missed.

In 1934, Farr and Eckerson *(438)* described the formation of cellulose membranes by microscopic particles of uniform size in linear arrangement In the cytoplasm of the young cotton fiber the authors identify these as particles of cellulose covered by pectic substance. They exist singly or in chains, and a single chain of closely oppressed particles forms a single fibril of the fiber wall. The particles have a lengthwise refractive index of 1.565 and a crosswise value of 1.530, which are the same values obtained for a fibril after separating this from the fiber and freeing from pectic substance with ammonium hydroxide. The particles show the x-ray diffraction pattern of cellulose; furthermore, they are believed to be identical with cellulose because of their double refraction, their reaction with sulphuric acid and with iodine, and their refractive indices.

Additional amounts of these particles were separated by Farr and Eckerson *(439)* through treatment of cotton with hydrochloric acid (sp. gr. 1.19) for varying times, particularly after treatments as long as eighteen hours and five days. The authors recognized the fact that some hydrolysis may have occurred, but they state that various tests show the essential celulose nature of the particles to be unaltered. Farr and Sisson *(440)* describe the x-ray diffraction pattern for particles isolated by the hydrochloric acid treatment. Many other papers *(441-448)* have been published from this same laboratory which extend or emphasize certain of the above points.

The colloidal characteristics of cellulose membranes were described by Farr *(449)* before the Fourteenth Colloid Symposium at Minneapolis in 1937. In this paper she states that "a thin layer (colloidal matrix) surrounds the entire fiber. Thinner layers alternate with the cellulose fibers in the walls and . . . show the presence of an even thinner layer over each individual particle." In one of the above references it is noted that the cementing material, which is said to be pectic material, makes up about 3 to 4 per cent of the entire fiber mass.

A number of other papers bearing on the subject of the structure of the cell wall of higher plants have appeared from the laboratories of Harvard University, the U. S. Department of Agriculture, and the North Carolina Experiment Station at Raleigh, North Carolina. This series of papers includes one by Kerr and I. W. Bailey *(450)* on the structure, optical properties, and chemical components of the middle lamella. Without going into a detailed discussion, it can be noted that the authors show that the residues of the so-called middle lamella obtained by the action of 72 per cent sulphuric acid on mature wood always consist of at least three layers, namely, the residues of the two cambial walls which surround the adjoining fibers and the intercellular material. They recommend that the term "middle lamella" be used synonymously with intercellular substance in referring solely to the truly isotropic layer of intercellular material; also, that the term "primary wall" should be used only for designating the cambial wall and its homologues and other tissues.

A second paper of interest by I. W. Bailey and Kerr *(451)* deals with the visible structure of the secondary wall and its significance in physical and chemical investigations of tracheidal cells and fibers. They conclude that the "cellulose matrix of the swollen secondary wall of cotton of normal tracheid is an extremely heterogeneous but firmly coherent structure, the finer details of which grade down to the limits of microscopic visibility"; further, " . . . there is no reliable evidence to indicate that the matrix is composed of discreet entities of visible size—e.g., elementary fibrils, dermatosones, ellipsoidal bodies, etc., —that are bound together by non-cellulosic material. On the contrary, our data demonstrate that such putative entities actually are heterogeneous fragments that are shredded or disrupted from an original continuance or coherent matrix. If there are discontinuities in the structure pattern of the cellulose . . . they are confined to the submicroscopic field, e.g., to the realm of micelles or molecular chains. . . . 'Lignin' and other non-cellulosic constituents may be deposited in the elongated, intercommunicated interstices of the cellulose matrix, thus resulting in two continuous, interpenetrating systems."

Kerr *(452)* describes the structure of growth rings as already reported by Balls in the secondary wall of the cotton hair; the work indicates that the various lamellae seen in the secondary wall of the cotton hair are actual daily growth rings. Without detailing the manner whereby this conclusion is reached, it should be noted that the width of the daily deposition of cellulose varies within relatively wide limits. Cer-

(435) Minor, J. E., and Blaisdell, C. A., *Paper Ind.* 16, No. 6: 401-3 (September, 1934).
(436) Bechtel, A. R., *Paper Trade J.* 102, No. 1: 29-33 (Jan. 2, 1936).
(438) Farr, W. K., and Eckerson, S. H., Contrib. Boyce Thompson Inst. 6: 189-203 (1934).
(439) Farr, W. K., and Eckerson, S. H., Contrib. Boyce Thompson Inst. 6, No. 3: 309-13 (1934).
(440) Farr, W. K., and Sisson, W. A., Contrib. Boyce Thompson Inst. 6: 315-21 (1934).
(441) Farr, W. K., and Eckerson, S. H., Contrib. Boyce Thompson Inst. 6: 189-203 (1934).
(442) Farr, W. K., Proceedings of the Second Dearborn Conference of Agr. Ind., Science, Dearborn, Mich.: 205-7 (May 12-14, 1936).
(443) *Tech. Assoc. Papers* 19: 417-20 (1936).
(444) *Paper Trade J.* 101, No. 13: 87-90 (September 26, 1935).
(445) *Paper Mill* 58, No. 38: 44, 46, 48, 50, 52 (September 21, 1935).
(446) *Textile Research* 6: 518-20 (1936).
(447) *Am. Dyestuff Reptr.* 26: 143-5 (1937).
(448) *J. Applied Physics* 8: 228-32 (1937).
(449) Farr, W. K., *J. Phys. Chem.* 41, No. 7: 987 (October, 1937).
(450) Kerr, T., and Bailey, I. W., *J. Arnold Arboretum* 15: 327-49 (1934).
(451) Bailey, I. W., and Kerr, T., *J. Arnold Arboretum* 15, No. 3: 273-99 (July, 1935).
(452) Kerr, T., *Protoplasma* 27, No. 2: 229-41 (1937).

tain of them average approximately 0.25 to 0.27 micron in thickness. The author finds that it is difficult to see how units 1.1 microns wide, as described by Farr and Eckerson for the primary cellulose particles, can be fitted into a wall which has layers of this width, namely, 0.25 to 0.27 micron. In summarizing, Kerr notes that during the period of secondary wall deposition two lamellae, one compact and one more porous, are deposited every twenty-four hours. These two lamellae constitute a daily growth ring. The compact ones form apparently during the day and the porous ones at night. Anderson and Moore *(453)* have grown cotton under the influence of constant light and temperature and have succeeded in producing fibers which show no growth rings in their walls.

The subject of the orientation of cellulose in the secondary walls of tracheidal cells is described by I. W. Bailey and Vestal *(454)* through the use of a technique which involves delignification of lignified tissues, followed by the formation of crystals of iodine in the spaces left by the delignification. It is possible not only to develop the orientation of the cellulose as between layers in the secondary wall but also to observe fluctuations within the single layer. I. W. Bailey and Kerr *(455)* have also described the structural variability of the secondary wall as revealed by lignin residues. An interesting related investigation is that of I. W. Bailey and Vestal *(456)* in which they use wood-destroying fungi in a study of fiber structure.

The last references from this series are the papers which were presented by I. W. Bailey and by Anderson and Kerr before the Cellulose Division of the A. C. S., 1937 Spring Meeting in Chapel Hill. Bailey's paper deals with the cell wall structure of higher plants *(457)*; Anderson and Kerr discuss the growth and structure of cotton *(458)*. In this latter paper the authors are in strong conflict with the ellipsoidal particle hypothesis of Farr and Eckerson, for the only ellipsoidal particles they were able to find are believed to be small plastids containing starch.

Farr *(459)* has also considered the nature of cuprammonium solutions of cellulose. She concludes that "the cellulose component of the plant cell membrane does not dissolve in cuprammonium to produce the viscosities commonly attributed to it, but that the cementing material . . . is responsible for this much discussed phenomenon." Preceding this conclusion, she observes that "equal quantities of cotton fibers treated for increasing lengths of time with 1 per cent KOH or 0.5 per cent ammonium oxalate produced decreasing viscosities in the same order when added to cuprammonium. When small quantities of cotton fibers were added to excessive amounts of cuprammonium, the viscosity of the solution was low enough to permit the falling of the cellulose particles to the bottom of the flask. They were recovered and their size, shape, optical properties and microchemical properties were found to be unchanged."

It should be noted that the above work refers to the behavior of cotton cellulose in cuprammonium solution and not to pulp. The viscosity of the cuprammonium solution of a pulp has long been considered by many paper technologists to be related to the physical characteristics, particularly strength, of the paper made from that pulp, a high viscosity indicating high strength and a low viscosity, low strength. Furthermore, it has been considered that the viscosity value showed by the pulp is made up of the viscosities in cuprammonium solution of the various components and is affected by the amount of non-soluble material in the pulp, such as lignin, which if not corrected will cause an error in the concentration of the actual pulp solution. If the view of Mrs. Farr is correct, then the viscosity of the pulp would be due only to the non-cellulose components. In this connection, in a report presented at the Savannah, 1937 meeting of TAPPI, Lewis describes studies made at The Institute of Paper Chemistry by T. Alfred Howells *(460)* in which bleached wood pulps were extracted for long periods of time with pectic solvents, including 0.5 per cent ammonium oxalate, dilute acids, and dilute caustic solutions. The viscosities of the extracted pulps in cuprammonium hydroxide were practically the same as the viscosities of blanks prepared by heating the same pulps in the absence of pectic solvents at the temperature of extraction for the same period of time. The cuprammonium hydroxide solutions were centrifuged and small amounts of insoluble residues obtained. These were shown to be largely carbohydrate materials, the principal sugar after hydrolysis being glucose, with smaller amounts of galactose and pentosans. In some pulps a small amount of lignin was found.

Incidentally, Brauns and Lewis *(461)* describe a highly purified wood pulp of 99.1 per cent alpha-cellulose, 0.70 per cent pentosan, 0.049 per cent copper number and TAPPI viscosity of 32.1 centipoises. The analysis of this pulp shows that almost all of its uronic acid and pentosan material has been removed. Of interest in this connection is the fact that sheet-forming properties do not appear even after a long beating period, yet the pulp is highly viscous when dissolved in cuprammonium solution and this solution on centrifuging at high speed gives an insoluble residue so small in amount as to be negligible. This falls in line with earlier micro-cinématographic evidence from the same laboratory showing the relation of the limiting "membrane" to the sheet properties of pulps.

Other investigations on the structure of fibers have come from the laboratory of A. J. Bailey at the University of Washington in Seattle. Two of his papers cover the structure of the middle lamella. The first of these *(462)* describes the physical isolation of the middle lamella from unstained transverse sections of the Douglas fir by means of the micromanipulator and a binocular microscope. Needless to say, such an operation is extremely tedious and requires an enormous amount of work. Material thus obtained was microanalyzed for lignin and for pentosans; 71.38 per cent of the material was found to be lignin. The second article *(463)* shows the pentosan content to be 14.21 per cent of the middle lamella; thus the lignin and the pentosan make up 85.6 per cent of the

(453) Anderson, D. B., and Moore, J. H., *Am. J. of Botany* 24, No. 8: 503-7 (October, 1937).
(454) Bailey, I. W., and Vestal, M. R., *J. Arnold Arboretum* 18, No. 3: 185-95 (July, 1937).
(455) Bailey, I. W., and Kerr, T., *J. Arnold Arboretum* 18, No. 4: 261-72 (October, 1937).
(456) Bailey, I. W., and Vestal, M. R., *J. Arnold Arboretum* 18, No. 4: 196-205 (October, 1937).
(457) Bailey, I. W., *Ind. Eng. Chem.*, 30: 40-47 (January, 1938).
(458) Anderson, D. B., and Kerr, T., *Ind. Eng. Chem.* 30: 48-54 (January, 1938).
(459) Farr, W. K., *Pulp and Paper Mag. of Canada* 37: 74-78 (1936).
(460) Howells, T. A., *Paper Trade J.* 105, No. 27: 37-38 (December 30, 1937).
(461) Brauns, F. E., and Lewis, H. F., *Paper Trade J.* 105, No. 10: 35-37 (September 2, 1937).
(462) Bailey, A. J., *Ind. Eng. Chem., Anal. Ed.* 8, No. 1: 52-54 (January 15, 1936).
(463) Bailey, A. J., *Ind. Eng. Chem., Anal. Ed.* 8, No. 5: 389-91 (September 15, 1936).

middle lamella. The third article by Bailey *(464)* takes up the structure of the middle lamella. Digestion similar to commercial practice, except for a lower temperature, did not completely dissolve this material. Definite segments in the lamella of fir resisted solution by cooking liquors but were dissolved by sodium hypochlorite. New morphological features are described. Bailey *(465)* also describes the mechano-chemical dissection of wood fibers, finding the fine material resulting from fiber disintegration to consist of a hydrogel and granular debris. Bailey identified both as cellulosic in nature. The hydrogel formed a horny mass when dried and resisted softening almost completely when re-exposed to water. Fibrils were reduced to cylindrical units which seemed to be laid end to end to form the fibrils. The author discusses the ellipsoid particles of Farr and criticizes the tests which were used to identify the pectin portion of the cellulose membrane. A question is also raised relative to the contention of Farr that the optical effects obtained by the use of polarized light and usually ascribed to the ordinary molecular arrangement of cellulose are perhaps caused by the ellipsoid particles.

Further papers from the Forest Products Laboratory at Madison include a number by Ritter *(466)* on the morphology of cellulose fibers. These are largely survey papers in which existing material has been rather carefully reviewed by the author, who is an outstanding authority in this field. Ritter describes structural units termed fibrils, fusiform bodies, and finally spherical units in the continued dissection of a wood fiber. The spherical unit was found to have a diameter of 0.45 micron when swollen, and is therefore only half the size of the ellipsoids which Farr *(438)* has obtained from young cotton fibers. Ritter and Stillwell *(467)* have measured the rate of formation of the crystalline structure of wood fibers. Differences in the radial growth of the tree trunk and the terminal and radial growth of small branches are described. Stillwell *(468)* has also carried on an x-ray study of variations in the structure of wood fiber walls. Other interesting papers relating to the structure of fibers are those by Sponsler *(469)*, who describes the rate of carbohydrate condensation on a cell wall, and by Seifriz and Hock *(470)*. The latter believes that fibers are made up of fibrils which, in turn, yield much finer secondary fibrils, the diameter of which approaches the limit of microscopic visibility. The striated structure seen in the cellulose wall of plant cells they believe to be real property of the wall. The work of Seifriz and of Ritter thus leads to a picture of fine wood structure diametrically opposed to the conclusions of I. W. Bailey and Kerr *(451)*. Since much of the basic work of Ritter was published prior to 1931, no detailed description of his views can be given in this summary.

Finally, mention should be made of an application of the Spierer lens to a study of the structure of cellulose fibers. Considerable discussion has arisen from the use of the Spierer lens as described by Seifriz *(471)* and Thiessen *(472)*. These authors have published photomicrographs showing rod-like effects which they believe to be large micelles of cellulose. In contrast Ritter *(473)* and Clifford and Cameron *(474)* indicate that these are nothing but diffraction bands; the latter authors have reproduced these appearances by substituting many other materials besides cellulose. Berkley *(475)* also disagrees with the views of Seifriz and Thiessen.

(464) Bailey, A. J., *Paper Ind.* 18, No. 5: 379-81 (August, 1936).
(465) Bailey, A. J., *Paper Ind.* 17, No. 10: 735-39 (January, 1936).
(466) Ritter, G. J., *Paper Ind.* 16, No. 3: 178-83 (June, 1934); *Rayon & Melliand Text. Monthly* 16, No. 9: 522-24, 606-608 (September, October, 1935); *Paper Trade J.* 101, No. 18: 92-100 (October 31, 1935).
(467) Ritter, G. J., and Stillwell, C. W., *Paper Trade J.* 98, No. 22: 37-40 (May 31, 1934).
(468) Stillwell, C. W., *Physics* 4, No. 5: 167-71 (May, 1933).
(469) Sponsler, O. L., *J. Am. Chem. Soc.* 56, No. 7: 1597-99 (July, 1934).
(470) Seifriz, W., and Hock, C. W., *Paper Trade J.* 102, No. 19: 36-38 (May, 1936).
(471) Seifriz, W., *J. Phys. Chem.* 35, No. 1: 118-29 (January, 1931); *Protoplasma* 21: 129-59 (1934).
(472) Thiessen R., *Ind. Eng. Chem.* 24: 1032-41 (September, 1932).
(473) Ritter, G. J., *Paper Industry* 16: 178-183 (June, 1934).
(474) Clifford, A. J., and Cameron, F. K., *Ind. Eng. Chem.* 26: 1209-13 (November, 1934).
(475) Berkley, E. E., *Annals Missouri Bot. Garden* 21: 241 (1934).

TAPPI New England Section Discusses Costs and Flotation

The New England section of the Technical Association of the Pulp and Paper Industry and the Connecticut Valley Division of the American Paper and Pulp Association held a joint meeting Saturday evening last week at the Roger Smith Hotel, Holyoke, Mass. R. W. Pattison, chairman of the Connecticut Valley Division of the Superintendents Association, called the meeting to order and officers for the Superintendents Association were elected for 1939 as follows.

R. W. Pattison, chairman, American Writing Paper Corporation, Holyoke, Mass.; M. O. Morris, 1st vice chairman, Case Bros. Inc., Highland Park, Conn.; Arthur Hobday, 2nd vice chairman, Southworth Paper Company, W. Springfield, Mass.; T. C. Bowen, secretary-treasurer, Parsons Paper Company, Holyoke, Mass.

The nominating committee consisted of—Charles Champion, Millers Falls Paper Company, Millers Falls, Mass.; A. B. C. Drew, Pairpoint Corporation, New Bedford, Mass.; Cornelius Stapley, Chemical Paper Manufarturing Company, Holyoke, Mass.

The meeting was then turned over to John B. Calkin, chairman of the New England Section of TAPPI. Officers of the New England Section elected for the coming year were as follows:

Randall Doughty, chairman, Fitchburg Paper Company, Fitchburg, Mass.; William Talbot, vice chairman, Dennison Manufacturing Company, Framingham, Mass.; Herman Barker, Treasurer, Bird & Son, E. Walpole, Mass.; Helen U. Kiely, secretary, American Writing Paper Corporation, Holyoke, Mass.

Executive committee: John B. Calkin, Dennison Manufacturing Company, Framingham, Mass.; F. C. Clark, Newton, Mass.; Roger C. Griffin, Arthur D. Little, Inc., Cambridge, Mass.; E. O. Reed, Crane

& Co., Dalton, Mass.; William Foote, B. F. Perkins & Sons, Holyoke, Mass.; Fred Schneider, Hampden Color and Chemical Company, Springfield, Mass.; F. H. Leonard, Marble-Nye Company, Providence, R. I.; John P. Kennedy, American Writing Paper Corporation, Holyoke, Mass.

The nominating committee consisted of: Lewis K. Burnett, Robert Gair Company, Piermont, N. Y.; John P. Kennedy, American Writing Paper Corporation, Holyoke, Mass.; E. O. Reed, Crane & Co., Dalton, Mass.

Vincent F. Waters, technical assistant to R. G. Macdonald, secretary of National TAPPI, extended the greetings of the National Association.

Philip A. Ray Speaks

The first speaker was Philip A. Ray, of the Hercules Powder Company, Wilmington, Del., who presented a paper on "Flotation Principles as Applied to the Removal of Rubber from Rags".

Dr. John Hagenauer Speaks

Dr. John Hagenauer, of the Elk Paper Company, Childs, Md., and consultant for the A.P.P.A., was the second speaker with his subject "Paper Machine Conversion Losses". Dr. Hagenauer gave a very interesting talk regarding the great losses obtained in paper production and submitted figures based on a recent survey of losses in thirty-five concerns representing book, writing and sulphite wrappings. The total fiber loss alone in mills surveyed ranged from 10 to 15 per cent. In addition the losses of other materials used in the furnishes were as follows: Clay —from 21 to 55 per cent; Size—from 30 to 35 per cent; Starch—from 31 to 44 per cent; Alum—from 50 to 74 per cent.

The money value of these lost materials is extremely high when these losses are figured over a period of several years. The fiber loss alone makes necessary the conversion of thousands of acres of woodland into pulp which could be saved if more effective measures were adopted by paper mills.

Dr. Hagenauer strongly recommended the application of technical control methods to curtail these losses and feels that their efforts would be well repaid in materials saved.

Those in Attendance

Those in attendance were: W. F. Talbot and J. B. Calkin, Framingham, Mass.; Mr. and Mrs. F. A. Johnson, William Dalrymple, Mr. and Mrs. Fred Stapley, Mr. and Mrs. John P. Kennedy, Mr. and Mrs. R. W. Pattison, M. V. Horgan, T. J. Flaherty, Leonard P. Taylor, Helen U. Kiely, Donald C. Young, E. C. Reid, Florence Healy, Mr. and Mrs. John H. Browne, Cornelius Stapley, C. R. O'Neill, Mr. and Mrs. A. J. DeCanagne, Mr. and Mrs. F. B. Shepard, C. H. Kent, Mr. and Mrs. S. A. Brunell, Mr. and Mrs. H. A. Miller, R. F. Irwin, Ralph Scott, Mr. and Mrs. George Hardaker, P. S. Sinclair, Holyoke, Mass.; A. H. Gilmour, N. Westchester, Conn.; Mr. and Mrs. R. E. Kilty, Mr. and Mrs. R. D. McCarron, Mr. and Mrs. J. J. Thomas, Murray Rubin, Fred Schneider, Mr. and Mrs. F. L. Barstow, Springfield, Mass.; T. A. Rowlands, Skaneateles Falls, N. Y.; J. J. O'Brien, Mr. and Mrs. J. F. Wright, Boston, Mass.; E. R. Granger, Waterbury, Conn.; V. S. Denison, Beloit, Wis.; Mr. and Mrs. Hill, Providence, R. I., Vincent F. Waters New York City, A. F. Bailey, Providence, R. I.; G. W. Craigie, Mr. and Mrs. George Carroll, Bennington, N. H., Norman Alper, Providence, R. I.; Arthur M. Brooks, Andover, Mass.; J. E. Helquist, Newark, N. J., Mr. and Mrs. D. K. Bartlett, Jr., W. Dudley, Mass.; C. H. Porter, Turners Falls, Mass.; W. E. Warren, Housatonic, Mass.; P. A. Ray, Wilmington, Del.; S. A. Brown, Milton Yeoman, Anthony J. Urbanetti, S. Manchester, Conn.; L. K. Burnett, Robert Vaeth, Piermont, N. Y.; Mr. and Mrs. Gordon Booth, Haverhill, Mass.; Dr. J. P. Hagenauer, Childs, Md.; John Dickson, New York City; William J. Burke, Providence, R. I.; E. J. Johnstone, Newfane, N. Y.; Mr. and Mrs. R. Mannheim, Providence, R. I.; Mr. and Mrs. Kurt Wandell, New York City; Mr. and Mrs. A. G. Caldwell, Hamden, Me.; B. J. Mayo, Boston, Mass.; Mr. and Mrs. M. E. Blew, W. Springfield, Mass.; P. D. Bradley, Lawrence, Mass.; H. L. Mellen, Monroe, Bridge, Mass.; Mr. and Mrs. M. O. Morris, Highland Park, Conn.; W. H. Anderson, Windsor Locks, Conn.; Mr. and Mrs. A. B. Drew, New Bedford, Mass.; C. P. Kirchen, W. Groton, Mass.; Chas. Champion, Millers Falls, Mass.; M. B. Newell, Burnside, Conn.; Fred Schueler, Lawrence, Mass.; Mr. and Mrs. O. W. Messner, Montville, Conn.; Mr. and Mrs. Robt. Page, Montville, Conn.; Russell W. Hamilton, E. Pepperell, Mass.; Frank Massey, P. H. Mudgett, Herman, T. Barker, E. Walpole, Mass.; Walter G. Hendrich, Paul E. Tupper, Dalton, Mass.; Charles Backus, James Fitzgerald, N. Wilbraham, Mass.; John M. McGarry, L. B. Tucker, L. E. Richards, F. H. Williams, E. O. Reed, Dalton, Mass.; Mr. and Mrs. W. P. Morris, Belchertown, Mass.

Heads F. C. Huyck & Sons

[FROM OUR REGULAR CORRESPONDENT]

RENSSELAER, N. Y., December 12, 1938—Announcement is made that Woolsey W. Weed, formerly of Albany and for many years head of the Kenwood Mills Ltd., at Arnprior, Canada, has been named president of F. C. Huyck & Sons to succeed the late Frank C. Huyck. Mr. Weed succeeds Holdon M. Ashby as president, the latter taking the position vacated by Mr. Huyck. The directors met in this city during the week at which time the reorganization was announced. Mr. Weed, formerly vice president of the company, has been at the Canadian branch since 1919. He plans to return to Albany but will continue to have charge of Kenwood Mills, Ltd., a wholly owned subsidiary. Other new officers elected were: James L. Braman, vice president and treasurer; Francis Huyck Eldridge, vice president and general manager; Harry Eldridge, secretary and assistant treasurer, and Charles V. Spencer, comptroller. Mr. Braman, in becoming a vice president, will continue as treasurer which office he has held for many years. Francis H. Eldridge becomes vice president and general manager after serving for some time as assistant treasurer. He and Harry Eldridge, new secretary and assistant treasurer, are nephews of the late Mr. Huyck and have been connected with the company for a number of years. The board of directors as constituted now includes Holdon M. Ashby, James L. Braman, J. T. Colby, D. C. Jordan, F. H. Eldridge, Harry Eldridge, W. A. Eldridge, E. A. Rees, T. I. Van Antwerp, Woolsey W. Weed and W. A. Wooster.

Imports of Paper and Paper Stock

Giving Manifests of New York, Boston, Philadelphia and Other Ports of Newsprint, Wrapping, Writing, Coated, Blotting, Tissue, Strawboard, Wallboard, Cigarette Papers, Sulphite, Kraft and Ground Wood Pulp.

NEW YORK IMPORTS

WEEK ENDING DECEMBER 10, 1938

SUMMARY

Cigarette paper .....76 cs.
Wall paper .....10 bls., 2 cs.
Paper hangings .....13 bls., 3 cs.
Newsprint .....2,874 cs.
Printing paper .....27 cs.
Wrapping paper .....249 rolls, 3 cs.
Drawing paper .....3 cs.
Filter compound .....124 bls.
Filter paper .....2 cs.
Surface coated paper .....77 cs.
Surface baryta coated paper .....19 cs.
Basic paper .....52 crates, 51 cs.
Decalcomanias .....18 cs.
Decalcomania paper .....44 drums, 3 cs.
Transfer pictures .....4 cs.
Tracing cloth .....34 cs.
Card board .....2 cs.
Colored paper .....2 cs.
Writing paper & envelopes .....3 cs.
Paper tubes .....63 ctns., 18 cs.
Miscellaneous paper .....59 cs.

CIGARETTE PAPER

R. J. Reynolds Tobacco Co., *Pr. Roosevelt,* Havre, 76 cs.

WALL PAPER

———, *Columbus,* Bremen, 1 cs.
F. J. Emmerich, *Columbus,* Bremen, 10 bls., 1 cs.

PAPER HANGINGS

W. H. S. Lloyd & Co., *American Trader,* London, 13 bls., 3 cs.

NEWSPRINT

Lunham & Reeve, Inc., *Scanmail,* Kotka, 142 rolls.
N. Y. Evening Journal, *Pr. Roosevelt,* Finland, 249 rolls.
Jay Madden Corp., *Pr. Roosevelt,* Finland, 548 rolls.
J. Madden Corp., *Columbus,* Finland, 289 rolls.
———, *Bergensfjord,* Oslo, 93 rolls.
———, *Bergensfjord,* Skien, 30 rolls.
Jay Madden Corp., *Carolina Thorden,* Kotka, 1,055 rolls.
N. Y. Evening Journal, *Carolina Thorden,* Kotka, 217 rolls.
Wilkinson Bros., & Co., Inc., *Korsholm,* Kotka, 69 rolls.
Jay Madden Corp., *Korsholm,* Kotka, 182 rolls.

PRINTING PAPER

Steiner Paper Corp., *Gerolstein,* Antwerp, 13 cs.
R. Wilson Paper Corp., *Calendonia,* Glasgow, 13 cs. (uncoated).
S. H. Pomerance, *Aurania,* London, 1 cs.

WRAPPING PAPER

Jay Madden Corp., *Pr. Roosevelt,* Finland, 249 rolls.
Steiner Paper Corp., *Black Heron,* Antwerp, 3 cs.

DRAWING PAPER

———, *Columbus,* Bremen, 3 cs.

FILTER COMPOUND

———, *Pr. Roosevelt,* Hamburg, 124 bls.

FILTER PAPER

H. Reeve Angel & Co., Inc., *American Trader,* London, 2 cs.

SURFACE COATED PAPER

Gevaert Co., of America, *Pennland,* Antwerp, 77 cs. (unfinished photo-paper).

SURFACE BARYTA COATED PAPER

Dingelstedt & Co., *Gerolstein,* Antwerp, 12 cs.
Dingelstedt Co., *Pennland,* Antwerp, 7 cs.

BASIC PAPER

Globe Shipping Co., *Columbus,* Bremen, 52 crates, 51 cs.

DECALCOMANIAS

Sellers Transportation Co., *Columbus,* Bremen, 18 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., *American Importer,* Liverpool, 3 cs., 21 drums.
B. F. Drakenfeld & Co., *Georgic,* Liverpool, 23 drums.

TRANSFER PICTURES

Rohner Gehrig & Co., *Columbus,* Bremen, 4 cs.

TRACING CLOTH

E. Dietzgen & Co., *American Importer,* Manchester, 23 cs.
C. Bruning & Co., *Columbus,* Bremen, 11 cs.

CARD BOARD

Gondrand Shipping Co., *Pr. Roosevelt,* Hamburg, 25 cs. (sheets).

COLORED PAPER

D. C. Andrews & Co., *Columbus,* Bremen, 2 cs.

WRITING PAPER & ENVELOPES

———, *American Trader,* London, 3 cs.

PAPER TUBES

———, *Columbus,* Bremen, 63 ctns., 18 cs.

MISCELLANEOUS PAPER

Corn Exchange Bank Trust Co., *Kimikawa Maru,* Kobe, 25 cs.
Corn Exchange Bank Trust Co., *Hokkai Maru,* Kobe, 16 cs.
H. Reeve Angel & Co., Inc., *Hokkai Maru,* Yokohama, 8 cs.
———, *Hokkai Maru,* Yokohama, 10 cs.

RAGS, BAGGINGS, ETC.

Chase National Bank, *Kimikawa Maru,* Kobe, 36 bls. rags.
Delia Waste Products Corp., *Kimikawa Maru,* Kobe, 70 bls. rags.
Loumar Textile By Products, Inc., *Pr. Roosevelt,* Hamburg, 119 bls. bagging.
Leigh Textile Co., *American Importer,* Manchester, 82 bls. paper stock.
———, *American Importer,* Manchester, 12 bls. paper stock, 10 bls. thread waste.
———, *Gerolstein,* Antwerp, 34 bls. rags.
Hughes Fawcett, Inc., *Gerolstein,* 12 bls. flax waste.
W. Steck & Co., *Black Heron,* Rotterdam, 162 bls. bagging.
Loumar Textile By Products, Inc., *Black Heron,* Rotterdam, 55 bls. bagging.
Darmstadt Scott & Courtney, *Black Heron,* Rotterdam, 96 bls. bagging.
E. J. Keller Co., Inc., *Black Heron,* ———, 131 bls. bagging.
Royal Manfg Co., *Black Heron,* Antwerp, 6 bls. rags.
Hughes Fawcett, Inc., *Black Heron,* Antwerp, 13 bls. flax waste.
Darmstadt Scott & Courtney, *Edam,* Rotterdam, 137 bls. bagging.
Darmstadt Scott & Courtney, *Noordam,* Rotterdam, 37 bls. bagging.
G. W. Millar & Co., Inc., *Noordam,* Rotterdam, 34 bls. bagging.
J. Cohen Son & Co., Inc., *Georgic,* Liverpool, 17 bls. rags.
———, *Georgic,* Liverpool, 43 bls. rags.
———, *Pennland,* Antwerp, 12 bls. flax waste.
E. J. Keller Co., Inc., *Excambion,* ———, 83 bls. rags.
———, *Excambion,* Alexandria, 98 bls. rags.

OLD ROPE

Irving Trust Co., *Black Heron,* Antwerp, 89 coils.
E. J. Keller Co., Inc., *Noordam,* ———, 85 coils.
E. J. Keller Co., Inc., *Belvedere,* ———, 99 coils.

CASEIN

———, *Western Prince,* B. Ayres, 84 bags.

WOOD PULP

Castle & Overton, Inc., *Scanmail,* Wiborg, 1405 bls. wood pulp, 277 tons.
Pulp Sales Corp., *Scanmail,* Wiborg, 400 bls. sulphite, 80 tons; 3010 bls. sulphate, 594 tons.
———, *Columbus,* Bremen, 175 bls. wood pulp.
E. M. Sergeant Pulp & Chemical Co., Inc., *Bergensfjord,* Oslo, 125 bls. chemical pulp.
Irving Trust Co., *Bergensfjord,* Oslo, 500 bls. chemical pulp.
Chase National Bank, *Bergensfjord,* Oslo, 150 bls. sulphite.
Perkins Goodwin & Co., *Bergensfjord,* Drammen, 125 bls. sulphite.
The Borregaard Co., Inc., *Bergensfjord,* Sarpsborg, 150 bls. sulphite, 918 bls. sulphate.
Gottesman & Co., Inc., *Belvedere,* Trieste, 750 bls. wood pulp.
Pulp Sales Corp., *Carolina Thorden,* Viborg, 3048 bls. sulphite.
Castle & Overton, Inc., *Carolina Thorden,* Viborg, 264 bls. wood pulp.
Castle & Overton, Inc., *Korsholm,* Viipuri, 520 bls. wood pulp.
Pulp Sales Corp., *Korsholm,* Viipuri, 800 bls. mechanical ground pulp.
J. Andersen & Co., *Korsholm,* Gothenburg, 125 bls. sulphite.
———, *Hein Hoyer,* Kalix, 500 bls. chemical pulp, 100 tons.
———, *Hein Hoyer,* Obbola, 2800 bls. sulphate, 400 tons.
Cellulose Sales Co., Inc., *Hein Hoyer,* Sundsvall, 1650 bls. sulphate, 275 tons, 3,180 bls. sulphite, 566 tons.
Mead Sales Co., Inc., *Hein Hoyer,* Sundsvall, 500 bls. sulphite, 100 tons.
Bulkley Dunton Pulp Co., Inc., *Hein Hoyer,* ———, 300 bls., sulphate, 50 tons.
———, *Hein Hoyer,* Hernosand, 4250 bls. sulphite, 6,210 bls. sulphate.
Price & Pierce, Ltd., *Belos,* ———, 750 bls. unbleached sulphite.

WOOD PULP BOARDS

Jay Madden Corp., *Scanmail,* Kotka, 108 bls., 60 rolls.
Jay Madden Corp., *Scanmail,* Wiborg, 47 bls.
Darcy Export Co., *Korsholm,* Gothenburg, 13 bls.
Salwen Paper Co., *Korsholm,* Gothenburg, 4 bls.

ALBANY IMPORTS

WEEK ENDING DECEMBER 10, 1938

Pulp Sales Corp., *Peggy Thorden,* Viipuri, 7,598 bls. sulphite, 3386 bls. sulphate.
Castle & Overton, Inc., *Peggy Thorden,* Viipuri, 527 bls. wood pulp.

PORTLAND IMPORTS

WEEK ENDING DECEMBER 10, 1938

———, *Hein Hoyer,* Kalix, 3,000 bls. chemical pulp, 600 tons.
Bulkley Dunton Pulp Co., Inc., *Hein Hoyer,* ———, 2070 bls. sulphite, 345 tons.
Cellulose Sales Co., Inc., *Hein Hoyer,* Sundsvall, 2,400 bls. sulphate, 400 tons.
J. Andersen & Co., *Hein Hoyer,* Sundsvall, 6,600 bls. sulphate, 1,100 tons.
———, *Hein Hoyer,* Hernosand, 7,620 bls. sulphate.
Price & Pierce, Ltd., *Hein Hoyer,* Hernosand, 300 bls. unbleached sulphate.

BOSTON IMPORTS

WEEK ENDING DECEMBER 10, 1938

Gottesman & Co., Inc., *Lagaholm,* Sweden, 1,240 bls. wood pulp.

NEW LONDON IMPORTS

WEEK ENDING DECEMBER 10, 1938

———, *Gretaston,* Woodfibre, B. C., 5.040 bls. sulphite.
Price & Pierce, Ltd., *Mertainen,* ———, 600 bls. bleached sulphite.

PHILADELPHIA IMPORTS

WEEK ENDING DECEMBER 10, 1938

Jay Madden Corp., *Scanmail,* Kotka, 234 bls. wood pulp boards.
Wilkinson Bros. & Co., Inc., *Scanmail,* Kotka, 208 rolls newsprint.
Price & Pierce, *Scanmail,* Stockholm, 180 bls. sulphite, 30 tons.
Castle & Overton, Inc., *Black Heron,* Rotterdam, 112 bls. wood pulp, 28 tons, 104 bls. rags.
E. J. Keller Co., Inc., *Black Heron,* ———, 213 bls. bagging, 35 bls. paper stock.
Pulp Sales Corp., *Korsholm,* Helsingfors, 762 bls. mechanically ground pulp.
Pulp Sales Corp., *Korsholm,* Viipuri, 2,032 bls. sulphite.
Public Ledger, Inc., *Korsholm,* Kotka, 342 rolls newsprint.
J. W. Hampton, Jr., & Co., *Korsholm,* Kotka, 177 rolls newsprint.
Parsons & Whittemore, Inc., *Korsholm,* Gothenburg, 81 rolls newsprint.
Perkins Goodwin & Co., *Korsholm,* Gothenburg, 350 bls. sulphite.
The Borregaard Co., Inc., *Korsholm,* Gothenburg, 106 rolls, 32 bls. paper.
———,*Hein Hoyer,* Hernosand, 1280 bls. sulphite.
Cellulose Sales Co., Inc., *Hein Hoyer,* Sundsvall, 299 bls. chemical pulp, 63 tons, 315 bls. sulphite, 63 tons.
Atterbury Bros., Inc., *Hein Hoyer,* Sundsvall, 900 bls. dry pulp, 150 tons.
Perkins Goodwin & Co., *Hein Hoyer,* Sundsvall, 432 bls. kraft sulphate, 72 tons.
Nolan Bowmall Co., Inc., *Hein Hoyer,* Sundsvall, 142 rolls newsprint.
Parsons & Whittemore, Inc., *Hein Hoyer,* Sundsvall, 84 rolls newsprint.
———, *Hein Hoyer,* Kalix, 1,500 bls. chemical pulp, 300 tons.

WILMINGTON IMPORTS

WEEK ENDING DECEMBER 10, 1938

Pagel Horton & Co., Inc., *Hein Hoyer,* Munksund, 1,500 bls. kraft sulphate, 250 tons.
———, *Hein Hoyer,* Hernosand, 3,000 bls. sulphate.

BALTIMORE IMPORTS

WEEK ENDING DECEMBER 10, 1938

Pulp Sales Corp., *Scanmail,* Kotka, 810 bls. sulphite, 162 tons.
Pulp Sales Corp., *Scanmail,* Wiborg, 1981 bls. sulphate, 396 tons; 1,015 bls. sulphite, 203 tons.
Pulp Sales Corp., *Scanmail,* Helsingfors, 1,222 bls. sulphite, 248 tons.
M. Sone, *Scanmail,* Stockholm, 240 bls. sulphite, 40 tons.
Pulp Sales Corp., *Korsholm,* Helsingfors, 2,032 bls. mechanically ground pulp.
Pulp Sales Corp., *Korsholm,* Viipuri, 477 bls. sulphate.
Castle & Overton, Inc., *Korsholm,* Viipuri, 513 bls. wood pulp.
Jay Madden Corp., *Korsholm,* Viipuri, 765 rolls newsprint.
Parsons & Whittemore, Inc., *Korsholm,* Gothenburg, 54 rolls newsprint.
Nolan Bowmall Co., Inc., *Korsholm,* Gothenburg, 62 rolls newsprint.
M. Sone, *Korsholm,* Gothenburg, 813 bls. wood pulp.
The Borregaard Co., Inc., *Korsholm,* Gothenburg, 1,000 bls. wood pulp.

NORFOLK IMPORTS

WEEK ENDING DECEMBER 10, 1938

Pulp Sales Corp., *Carolina Thorden,* Helsingfors, 1,016 bls. mechanically ground pulp.
Pulp Sales Corp., *Carolina Thorden,* Viborg, 585 bls. sulphite, 664 bls. sulphate.
Castle & Overton, Inc., *Carolina Thorden,* Viborg, 387 bls. wood pulp.
Lagerloef Trading Co., Inc., *Carolina Thorden,* Spjutsund, 3,810 bls. mechanically ground pulp.
Old Dominion Paper Co., Inc., *Carolina Thorden,* Kotka, 110 bls., 41 rolls newsprint.
W. M. Stone & Co., *Carolina Thorden,* Kotka, 193 rolls newsprint.
Pulp Sales Corp., *Carolina Thorden,* Finland, 925 bls. sulphate, 1,403 bls. sulphite.

NEWPORT NEWS IMPORTS

WEEK ENDING DECEMBER 10, 1938

Gottesman & Co., Inc., *Heddernheim,* Sweden, 3,025 bls. wood pulp.

New York Market Review

Office of the PAPER TRADE JOURNAL,
Wednesday, December 14, 1938.

As a whole, little change is reported in the wholesale paper market for the current week. General industrial activity shows a very small gain for the week and the pre-inventory period, which seasonally ushers in a lull prior to Christmas, commonly results in a slackening of trade in the primary markets. The index of general business activity for the week ended December 3, was up slightly from the preceding week to 93 per cent, compared to 84.6 per cent for the corresponding week last year. The estimated production of over 200 paper mills for the like period was 78.8 per cent, compared to 61.0 per cent for the week ended December 4, 1937. Production of paper board was 61.0 per cent for the week ended December 3, compared to 50.0 per cent for the corresponding week last year.

The demand for newsprint continues to slowly improve and while inventories at the mills and in publishers' hands are less than last year, stocks on hand are still larger than normal, as consumption slowly gains. Prices remain firm and no changes from prevailing market quotations are expected in the trade.

Although the pre-holiday slackening in the distribution of many products customary at this date may be sufficiently important for consideration, reports from manufacturers' representatives, jobbers, and general paper merchants, indicate that, in general, sales volume is being well maintained.

The demand for sulphite board bond papers is reported as about double that of last year and current sales are the highest of the current year. The demand for tissue papers is being well maintained and in general the sales of groundwood papers are also well maintained. Orders for kraft papers are running at a high level and production is also high. The demand for paper board continues relatively good. In general, prices are relatively firm, with no important changes reported this week.

Mechanical Pulp

No important change in the market situation of mechanical pulp is reported this week. Prices continue firm and unchanged.

Chemical Pulp

The demand for chemical pulp continues at about the level of the preceding week and no important changes in demand or prices are looked for in the near future. Prices are relatively firm for all types of high quality pulps, with a few sales of some of the lower grades of kraft pulp being reported at $2 reductions under prevailing quoted market prices.

Old Rope and Bagging

The business in old rope continues limited and the market is quiet. Prices are unchanged. The demand for old bagging is likewise limited at unchanged prices.

Rags

The demand for rags continues rather light. Prices on all grades of new and old domestic rags continue firm and no changes are reported this week. The foreign rag market continues inactive, at nominal prices.

Old Waste Paper

The demand for practically all grades of waste paper continues light. Prices are unchanged. Little change is expected in the trade and while prices are admittedly to be low, no change is looked for until demand improves.

Twine

A little improvement in the demand for some grades of twine is reported for the week. Prices are relatively firm on all grades of hard and soft fiber twines and conform to prevailing market quotations.

Empire State Paper Association Meets

A meeting of the Empire State Paper Association was held at the Fort Orange Club, Albany, December 9, with an excellent attendance which included several non members who were invited to sit in and participate in the program. Executive Secretary A. H. Chamberlain represented the National Paper Trade Association.

President J. V. McCarthy presided at the general session held in the morning and at the meeting of the Fine Paper Division in the afternoon. Vice-President M. S. Dilts presided at the Wrapping Division session in the afternoon, the feature of which was a discussion of the Certified Products Program of the Gummed Industries Association by R. A. Fife, managing director of that organization.

The Hudson Valley Paper Company and the W. H. Smith Paper Company were hosts at a luncheon given to all members and guests, and the association itself entertained all who remained for dinner before taking their evening trains to return home.

Rex Screw Conveyors

Catalogue No. 334 just issued by the Chain Belt Company, 1600 Bruce street, Milwaukee, Wis., describes in detail the Rex Screw Conveyors, parts and elevator buckets. Screw conveyors are in use in many plants for the efficient handling of solid and semi-liquid materials in the pulp, paper and other industries. Various types of steel screw conveyors, with specifications, suggestions for selection, capacity charts and information on installations are given.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, December 14, 1938.

ALUM (Activated)—Quotations on activated alum are firm and unchanged at prevailing market levels. The commercial grades are quoted at $.90 per 100 pounds, in 100 pound multi-wall bags, car lot quantities, f.o.b., works.

BLANC FIXE—Prices of blanc fixe continue under an improved demand and are unchanged at prevailing quotations. The pulp is quoted at from $42.50 to $45 per ton, in bulk; the powder is offered at from 3½ to 3¾ cents per pound, in barrels at works.

BLEACHING POWDER—The demand for bleaching powder is reported as improved with contracts being renewed at prevailing market quotations. Bleaching powder is quoted at from $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN—Quotations on casein remain unchanged for the week. Standard domestic ground casein, 20-30 mesh, is quoted at from 8½ to 9 cents per pound; 80-100 mesh, at from 9 to 9½ cents per pound; all prices in bags, car lot quantities.

CAUSTIC SODA—The demand for caustic soda is reported as improved, with prices firm and contracts being renewed at prevailing market quotations. Solid caustic soda is quoted at from $2.10 to $2.30 per 100 pounds; flake and ground at from $2.50 to $2.70 per 100 pounds, in drums, at works.

CHINA CLAY—The demand for china clay continues to improve. Prices are firm and unchanged. Domestic filler clay is quoted at from $6.50 to $12 per ton; coating clay at from $11 to $22 per ton, at mines. Imported clay is quoted at from $14.50 to $25 per ton, ship side.

CHLORINE—Quotations on chlorine remain firm with consumption reported improved and contracts are being renewed at prevailing market prices. Chlorine is quoted at $2.15 per 100 pounds, in single-unit tank cars, f.o.b., works.

ROSIN—The demand for rosin is reported as fair. "G" gum rosin is quoted at $4.30; "F" wood rosin is $4.25 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent gum rosin size is quoted at $2.54 per 100 pounds, f.o.b., shipping point.

SALT CAKE—The demand for salt cake is reported improved. Prices are firm and unchanged, ranging at from $12 to $13.50 per ton; chrome salt cake at from $11 to $12 per ton, f.o.b., shipping point. Imported salt cake is quoted at from $14.50 to $15 per ton, Gulf or Atlantic Seaboard, on dock.

SODA ASH—Quotations on soda ash are firm; demand continues to improve and contracts are being renewed at prevailing market levels. Prices on soda ash in car lots, at works, per 100 pounds, are as follows: in bulk, $.90; in bags, $1.05; and in barrels, $1.35.

STARCH—The demand for corn starch is reported improved. Prices are higher for the current week. Globe pearl is quoted at $2.60 per 100 pounds, in bags. Special paper starch is quoted at $2.70 in bags. All prices in car lots, f.o.b., Chicago.

SULPHATE OF ALUMINA—Quotations on sulphate of alumina continue unchanged with contracts being renewed at prevailing market levels. The commercial grades are quoted at $1.15; iron free at $1.30, per 100 pounds, in bags, car lot quantities, f.o.b., works.

SULPHUR—Prices of sulphur, now on the free list, continue unchanged, with contract being renewed at prevailing market prices. Annual contracts are quoted at $16 per long ton, f.o.b., cars at mines. Spot and nearby car lots are offered at $19 per ton.

Market Quotations

Paper

(Delivered New York)

News, per ton—			
Roll, contract	$50.00	@	—
Sheets	58.00	@	—
Kraft—per cwt.—Delivered Zone A			
No. 1 Northern	$4.75	@	$5.25
Superstandard	4.12½	@	4.62½
Northern Standard Wrapping	4.00	@	—
Standard Wrapping	3.50	@	—
Tissues—Per Ream—Carlots			
White No. 1	.92½	@	—
White No. 1 M. G.	.90	@	—
White No. 1½	.67½	@	—
White No. 2	.60	@	—
Anti-Tarnish M. G.	.75	@	—
Colored	.87½	@	—
Kraft	.75	@	—
Manila	.60	@	—
Unbl. Toilet, 1 M.	3.20	@	—
Bleached Toilet	5.26	@	—
Paper Towels—			
Unbleached	1.80	@	—
Bleached	2.10	@	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	8.25	@	9.75
No. 2 Jute	7.50	@	9.00
No. 1 Manila Wrapping, 35 lb.	5.00	@	—
No. 2 Manila Wrapping, 35 lb.	4.75	@	—
Boards, per ton—			
News	27.50	@	30.00
Chip	27.50	@	30.00
Sgl. Mla. Lt. Chip	42.50	@	—
Jute Lined Chip	42.50	@	45.00
White Pat. Coated	55.00	@	57.50
Kraft Liners	42.50	@	45.00
Binders Boards	71.00	@	77.00

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	31.05@ 36.50	32.20@ 37.75
85% Rag	.....	29.90@ 35.00
75% Rag	23.60@ 27.75	24.75@ 29.00
65% Rag	.....	21.65@ 26.25
50% Rag	17.55@ 21.50	18.70@ 22.75
25% Rag	14.65@ 17.75	15.80@ 19.25

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$8.20@$10.00	$9.35@$11.50
No. 2	7.30@ 9.00	8.50@ 10.25
No. 4	6.45@ 7.75	7.60@ 9.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper, Delivered in Zone 1:

No. 1 Glossy Coated	$10.80	@	$12.50
No. 2 Glossy Coated	9.25	@	10.75
No. 3 Glossy Coated	8.15	@	9.50
No. 4 Glossy Coated	7.65	@	9.00
No. 1 Antique (watermarked)	7.65	@	9.00
No. 2 Offset	7.00	@	8.25
A Grade E. F.	6.80	@	8.00
A Grade S. & S. C.	7.05	@	8.25
B Grade E. F.	6.25	@	7.50
B Grade S. & S. C.	6.50	@	7.75
C Grade E. F.	6.00	@	7.00
C Grade S. & S. C.	6.25	@	7.25
D Grade E. F.	5.70	@	6.75
D Grade S. & S. C.	5.95	@	7.00

Ivory & India at $.50 cwt. extra.

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—			
Moist	25.00	@	28.00
Dry	25.00	@	28.00
(Delivered)			
No. 1 Domestic and Canadian	29.00	@	33.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—			
Prime Bleached Sulphite	2.35	@	2.75
Prime Qualities—Easy-Bleaching Sulphite	1.90	@	2.10
Strong Unbleached Sulphite	1.80	@	2.00
(On Dock, Atlantic Ports)			
Kraft Bleached	2.25	@	2.75
Kraft Light & Strong	1.75	@	1.85
Kraft No. 1	1.55	@	1.75
Kraft No. 2	1.50	@	1.55
(F. o. b. Pulp Mill)			
Kraft Domestic	1.25	@	1.75
(Delivered)			
Soda Bleached	2.55	@	—

Add 60 cents per short ton, dock charges for Albany; $2.50 for Lake Ports East and $3.50 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1.	7.00	@	7.25
Silesias No. 1	4.00	@	4.25
New Unbleached	6.75	@	7.00
Blue Overall	5.00	@	5.25
Fancy	2.10	@	2.25
Washables	1.60	@	1.70
Mixed Khaki Cuttings	3.25	@	3.75
O. D. Khaki Cuttings	4.00		4.25

Old Rags

White, No. 1—			
Repacked	3.15	@	3.40
Miscellaneous	2.60	@	2.75
White, No. 2—			
Repacked	1.90	@	2.10
Miscellaneous	1.50	@	1.60
Thirds and Blues—			
Repacked	1.40	@	1.50
Miscellaneous	1.25	@	1.30
Roofing Rags—			
No. 1	1.15	@	1.20
No. 2	.90	@	1.00
No. 3 (bagging)	.85	@	.90
No. 4	.65	@	.70
No. 5A	.65	@	.70

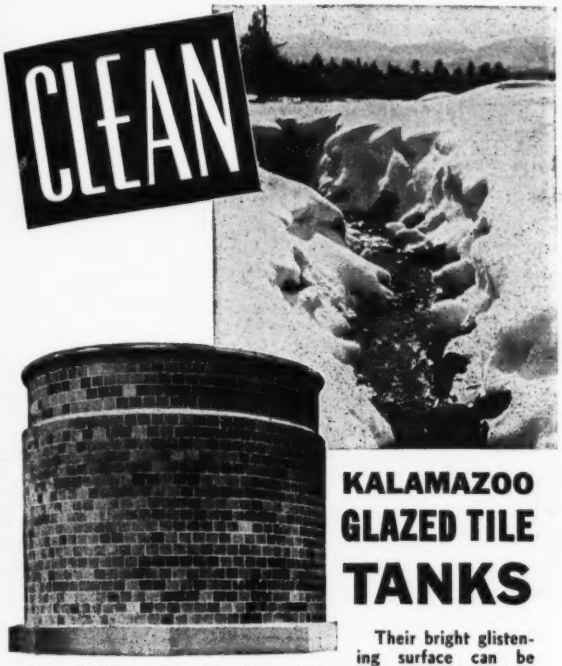
Foreign Rags

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	@	2.20
New Light Silesias	5.50	@	5.75
Light Flannelettes	5.50	@	5.75
New White Cuttings	7.00	@	7.50
New Light Oxford	4.00	@	4.50
New Light Prints	3.00	@	3.25

Old Rags

No. 1 White Linens	7.50	@	8.50
No. 2 White Linens	6.50	@	7.50
No. 3 White Linens	4.50	@	—



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Manufacturers of wood tanks for 60 years.

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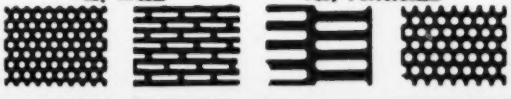
Perforations that are accurate in size

Any Metal — Any Perforation



The Harrington & King PERFORATING CO.

5652 FILLMORE ST., CHICAGO, ILL. 114 LIBERTY ST., NEW YORK, N.Y.

WATERBURY FELTS

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H. WATERBURY & SONS CO.

ORISKANY, NEW YORK

Combine superior finish and exceptional accuracy of both body and journal surfaces with maximum hardness and strength. Made in chilled iron or the extra hard "Farreloy" for every paper mill application. Any diameter from 4" to 72" and any length of face up to 312".

FARREL-BIRMINGHAM COMPANY, INC.

50 State St., Ansonia, Conn.

No. 4 White Linens.	2.25	@	3.25
No. 1 White Cotton.	4.25	@	4.75
No. 2 White Cotton.	3.25	@	3.75
No. 3 White Cotton.	2.50	@	3.00
No. 4 White Cotton.	1.90	@	2.20
Extra Light Prints..	2.00	@	2.40
Ord. Light Prints...	1.75	@	2.15
Med. Light Prints...	1.55	@	1.95
Dutch Blue Cottons.	2.25	@	2.50
French Blue Linens..	3.00	@	—
Checks and Blues...	2.00	@	—
Linsey Garments....	1.90	@	2.00
Dark Cottons.....	1.50	@	1.60
Old Shopperies.....	1.30	@	1.45
New Shopperies.....	1.45	@	1.50
French Blues.....	2.25	@	2.50

Old Rope and Bagging

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	2.40	@	2.50
Domestic	2.25	@	2.35
Wool Tares, light...	1.80	@	1.90
Wool Tares, heavy...	1.90	@	2.00
Bright Bagging.....	1.70	@	1.80
Manila Rope—			
Foreign	2.60	@	2.75
Domestic	2.50	@	2.75
Jute Threads.....	2.75	@	3.00
Sisal Strings.....	1.50	@	1.60
Mixed Strings.....	.60	@	.70

Old Waste Papers

(F. o. b. New York)

Shavings—			
White Envelope Cuttings	2.40	@	2.50
Ordinary Hard White No. 1....	1.90	@	2.00
Soft White No. 1..	1.75	@	1.80
Soft White Extra..	2.25	@	2.40
Flat Stock—			
Stitchless	.80	@	.85
Overissue Mag.....	.70	@	.75
Solid Flat Book...	.60	@	.65
Crumbled No. 1...	.40	@	.45
Ledger Stock White.	1.15	@	1.25
Ledger Stock Colored	.65	@	.70
New B. B. Chips....	.15	@	.20
Manila—			
New Env. Cut.....	1.40	@	1.50
New Cuttings.....	1.25	@	1.35
Old Kraft Machine— Compressed bales..	.65	@	.75
News—			
No. 1 White News	1.30	@	1.40
Strictly Overissue..	.50	@	.55
Strictly Folded....	.30	@	.35
No. 1 Mixed Paper..	.15	@	.20

Twines

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.11	@	.13
White Hemp.....	.12	@	.14
Fine Polished—			
Fine India.....	.15	@	.17
Unpolished—			
Box	.08½	@	—
Paper Makers.....	.07½	@	.08¼
Tube Rope.....	.09	@	.10
Wall Paper.....	.10	@	.11
Wrapping	.11	@	.13
Soft Fiber Rope...	.09½	@	.11½
Cotton	.17	@	.22

(Hard Fiber)

Medium Java.....	.10	@	.16
Mex. Sisal.....	.09	@	.15
Manila	.18	@	.25
Domestic	2.65	@	2.75
Sisal Rope.....	1.65	@	1.85
Mixed Rope.....	.50	@	.75
Transmission Rope...	1.90	@	2.00
Soft Jute Rope.....	1.90	@	2.10
Jute Carpet Threads.	.75	@	.90
Gunny Bagging—			
Foreign	2.00	@	—
Domestic	1.75	@	1.85
Bleachery Burlap....	3.25	@	3.50
Scrap Burlap—			
Foreign	1.60	@	—
Domestic	1.40	@	1.55
Scrap Sisal.....	1.25	@	1.50
Scrap Sisal for Shredding	1.50	@	1.65
Wool Tares, Heavy..	1.60	@	1.65
New Burlap Cuttings	2.00	@	2.25
Aust. Wool Pouches.	2.75	@	3.25
Heavy baling bagging	1.75	@	1.85
Paper Mill Bagging..	1.00	@	1.15
No. 2 Bagging.....	.55	@	.75

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints...	.03¼	@	.03½
New White No. 1...	.06¾	@	.07
New Light Flannelettes	.04¼	@	.04¾
Silesias No. 1.....	.04¼	@	.04½
New Black Silesias..	.03¾	@	.04
Silesias No. 1			
Soft Unbleached.....	6.50	@	7.00
Blue Cheviots.....	.05	@	.05¼
Fancy	.03	@	.03¼
Washable	.02¾	@	.03
Cottons—According to grades—			
Blue Overalls.....	.04¾	@	.05
New Black, soft...	.03¾	@	.04
Khaki Cuttings.....	.03	@	.03½
O. D. Khaki.....	.04	@	.04½
Corduroy	.02¾	@	.03
New Canvas.....	.06¾	@	.07¼
B.V.D. Cuttings.....	—	@	.06½

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues.....	1.75	@	2.00
Old Blue Overalls...	1.50	@	—
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings.....	3.90	@	4.00
Roofing Stock—			
No. 1.....	1.00	@	1.10
No. 2.....	.75	@	.85
No. 3.....	.65	@	.70

Foreign Rags

(F. o. b. Boston)

Dark Cottons.....	1.05	@	1.15
Dutch Blues.....	2.65	@	2.75
New Checks and Blues	2.85	@	3.00
Old Fustians.....	2.25	@	2.50
Old Linsey Garments	2.20	@	2.25
New Silesias.....	4.75	@	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.06	@	.06¼
New White, No. 2.	.03½	@	.04
Light Silesias.....	.03½	@	.04
Silesias, No. 1....	—	@	.04½
Black Silesias, soft	—	@	.03
New Unbleached..	.05½	@	.06
Washable, No. 1..	.01½	@	.01¾
Blue Overall.....	.04	@	.04½
Cottons—Acording to grades—			
Washable No. 2...	.01	@	.01¾
New Blue.....	.01	@	.01¾
Fancy Percales....	—	@	.02½
New Black Soft...	.03	@	.03½
New Light Seconds	—	@	.04½
New Dark Seconds	.50	@	.75
Khaki Cuttings—			
No. 1 O. D.....	.03	@	.03½
No. 2 Mixed.....	.02	@	.02½
Corduroy	—	@	.02
New Canvas.....	.05	@	.05½
New Black Mixed.	.02½	@	.02¾

Domestic Rags (Old)

White No. 1—			
Repacked	3.00	@	3.25
Miscellaneous	2.50	@	2.75
Thirds and Blues—			
Miscellaneous	1.00	@	1.25
Repacked	1.50	@	1.75
Black Stockings (Export)	3.00	@	3.50
Roofing Stock—			
Foreign No. 1....	—	@	.95
Domestic No. 1...	—	@	.95
Domestic No. 2...	—	@	.85
Roofing Bagging..	—	@	.60

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	1.75	@	2.00
Domestic	1.50	@	1.75
Manila Rope.....	—	@	3.50
Sisal Rope.....	1.50	@	1.75
Mixed Rope.....	.75	@	1.00
Scrap—			
No. 1.....	—	@	1.75
No. 2.....	1.00	@	1.25
Wool Tares, heavy..	3.25	@	3.50
Mixed Strings.....	.75	@	1.00
No. 1 New Light Burlap	2.50	@	3.00
New Burlap Cuttings	1.75	@	2.00

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White.	2.25	@	2.30
No. 2 Hard White.	1.90	@	2.00
No. 1 Soft White..	1.75	@	1.80
No. 2 Soft White..	1.30	@	1.40
No. 1 Mixed.....	.65	@	.75
Solid Ledger Stock..	1.45	@	1.50
Ledger Stock, white.	1.15	@	1.20
Ledger Stock, colored	.75	@	.80
No. 1 Books, heavy..	.60	@	.75
Manila Cuttings.....	1.45	@	1.50
Print Manila.....	.40	@	.45
Container Manila....	.35	@	.40
Kraft Paper.....	.75	@	.80
No. 1 Mixed Paper..	.20	@	.25
Straw Board Chip...	.25	@	.30
Binders Board Chip.	.25	@	.30
Corrugated Board...	.50	@	.55
Overissue News.....	.40	@	.45
Old Newspapers.....	.35	@	.40

BOSTON

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.25	@	2.50
No. 1 Soft White..	1.85	@	2.15
No. 2 Mixed.....	.75	@	.80
Solid Ledger Books..	1.30	@	—
Overissue Ledger Stock	1.30	@	1.50
Mixed Ledgers.....	.85	@	.90
No. 1 Books, heavy..	.65	@	.75
No. 1 Books, light...	.65	@	.75
Crumpled Stitchless Book Stock.....	.55	@	.65
Manila Env. Cuttings	1.85	@	2.00
Manila Envelope Cuttings, extra quality.	2.00	@	2.10
No. 1 Old Manila...	.80	@	.90
White Blank News..	1.30	@	1.40
No. 1 Kraft.....	.90	@	—
Mixed Papers.....	.15	@	—
Print Manila.....	.45	@	.55
Container Manilas...	.27½	@	—
Old Newspapers.....	.25	@	.32½
Paper Wool Strings..	.65	@	.75
Overissue News.....	.45	@	.50
Box Board Chips....	.20	@	.25
Corrugated Boxes....	.30	@	.35
Kraft corrugated boxes	.65	@	.70
Screening Wrappers..	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.65	@	2.75

CHICAGO

Old Papers

(F. o. b. Chicago)

Shavings—			
No. 1 White Envelope Cuttings....	1.80	@	1.90
No. 1 Hard White.	1.70	@	1.80
No. 1 Soft White..	1.50	@	—
Ledger & Writings..	.75	@	.80
Solid Books.....	.45	@	.50
Blanks	.90	@	—
Krafts	.45	@	.50
New Kraft Cuts.....	1.10	@	—
Manila Env. Cuts...	Nominal		
Ex. No. 1 Manila...	Nominal		
Print Manila.....	Nominal		
Overissue News.....	.35	@	—
Old Newspapers—			
No. 1 Folded News	.25	@	.30
No. 1 Mixed Paper	.15	@	.20
Roofing Stocks—			
No. 1.....	1.00	@	1.05
No. 2.....	.85	@	—

TORONTO

Paper

Bonds

Direct mill shipment in two-ton lots

No. 1 White	$35.50	@	—
No. 1 Tints	36.50	@	—
No. 2 White	25.50	@	—
No. 2 Tints	26.50	@	—
No. 2 Golden Rod..	27.50	@	—
No. 3 White	21.00	@	—
No. 4 White	15.00	@	—
No. 4 Tints	16.00	@	—
No. 4 Golden Rod..	17.00	@	—

Direct mill shipment in three-ton lots

No. 5 White	$10.50	@	—
No. 5 Tints	11.50	@	—
No. 5 Golden Rod..	12.00	@	—
No. 6 White	9.00	@	—
No. 6 Tints	9.50	@	—
No. 6 Golden Rod..	11.00	@	—
No. 7 White	8.00	@	—
No. 7 Tints	8.50	@	—
No. 7 Golden Rod..	10.00	@	—
Book—			
No. 1 M. F.	$7.00	@	—
No. 2 M. F.	6.50	@	—
No. 3 M. F.	5.25	@	—
No. 1 S. C.	7.25	@	—
No. 2 S. C.	6.75	@	—
No. 3 S. C.	5.75	@	—

Coated Book & Litho

Ton Lots (resale)

No. 1	$12.00	@	—
No. 2	10.25	@	—
No. 3	8.90	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown.....	4.85	@	5.25
White Wrap.....	4.00	@	—
"B" Manila.....	4.90	@	6.15
No. 1 Manila.....	5.50	@	6.90
Fiber	5.50	@	6.90
Kraft No. 2.....	5.50	@	6.90

(F. o. b. Cars, Toronto)

News per ton—			
Rolls (contract)...	46.00	@	—
Sheets	54.00	@	—

Pulp

Ground wood.....	29.00	@	—
Unbleached Sulphite.	49.00	@	—
Kraft	50.00	@	—
Soda	54.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut...	2.25	@	—
Soft White.....	2.15	@	—
White Blk. News..	1.25	@	—
Book and Ledger—			
Flat Magazine and Book Stock (old)	.80	@	—
Light and Crumpled Book Stock.	.70	@	—
Ledgers and Writings	1.10	@	—
Manilas—			
New Manila Cut..	1.35	@	—
Printed Manilas...	.45	@	—
Kraft	.95	@	—
News and Scrap—			
Strictly Overissue..	.50	@	—
Strictly Folded....	.45	@	—
No. 1 Mixed Paper..	.30	@	—

Domestic Rags

(Price to Mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06½	@	.06¾
Fancy Shirt Cuttings	.02¼	@	.02½